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MEDICAL ESSAYS

AND

OBSERVATIONS,

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MEDICAL

MEDICAL ESSAYS AND OBSERVATIONS.

VOL. V. PART II.

ARTICLE XLIII.

An extraordinary Abſtinence, *firſt thirty four Days, and ſoon after fifty four Days, accompanied with ſome remarkable Symptoms; by* JAMES ECCLES, M. D.

A Beautiful and handſome young Woman, about ſixteen Years of Age, had her *Menſes* regularly after ſhe paſt fifteen, till *February* 1720; when, upon occaſion of the unexpected Death of a moſt indulgent Father, at the

uſual Time of their Return, ſhe had an immoderate Flooding, accompanied with fainting and trembling Fits; which ſeemed to be hyſteric, and went off in a ſhort time, ſhe continuing pretty well, till near the Time her *Menſes* ſhould have returned; when ſhe had only an Appearance of them; and theſe Fits recurred, but abated ſoon after. At the Time of her next monthly Period, ſhe had not the leaſt Appearance of it; and the Fits then returned more frequent, violent, and evidently convulſive.

About the Beginning of *May* ſhe was blooded and vomited. In few Days a ſecond Vomit was given: And ſoon after it was over, ſhe was ſeized with a Difficulty in ſwallowing; which, in a Day or two, increaſed to that Degree, that ſhe could ſwallow nothing, but, upon every Attempt, ſhe fell preſently into a Fit, attended with prodigious Tremblings, and reciprocal Diſtenſions of the *Thorax* and *Abdomen*; which were performed in a Second, and would continue to be repeated ſometimes a Quarter, ſometimes half an Hour, and always ended in a *Tetanus*, or abſolute Rigidity of her whole Body: So that it was impoſſible to ply any of her Joints. She continued without eating or drinking from the Middle of *May* to the 15th of *June*, when ſhe was brought to Town; and her Phyſician, Dr. *William Eccles*, had the above Relation from her Mother and Siſters, who had waited upon her all that Time, but was himſelf Witneſs of what follows.

When he was called to viſit her, he cauſed a Spoonful of an *antihyſteric Julep* to be given: But as ſoon as it reached that Part of the *Oeſo-*

phagus

phagus affected with the Spaſm, which was about two Inches below the *Pharynx*, the *Tetanus* immediately ſeized her. Finding that no Remedies could be given by the Mouth, he cauſed Fomentations and Poultices of *antiſpaſmodic* and *nervous* Medicines to be applied to the Neck; but without Succeſs: Which made him order an Inſtrument to be made of Whalebone, with a Bit of Spunge fixed to one End of it, which was thruſt down to her Stomach, and met with conſiderable Reſiſtance at the contracted Part, both in thruſting it down, and pulling it back. However, after the ſecond Trial, the Spaſm yielded, and ſhe could ſwallow Liquids or Solids without Trouble.

She continued ſwallowing eaſily whatever was offered about three Weeks, but vomited every thing except the *antihyſteric* Mixture, Cherries or Strawberries; and very oft threw up ſome green Stuff, mixed with what ſhe had taken laſt.

She had been coſtive all the Time of this Abſtinence, and continued ſo after it was over; for which it was found neceſſary to give laxative Clyſters. After one of theſe, ſhe had a very conſiderable Evacuation of Blood by the *Anus*, to the Amount of two Pounds in two Days; which was reſtrained by the Uſe of ſome vulnerary and aſtringent Clyſters. But, in a ſhort time after, ſhe perceived the Spaſm of the *Oeſophagus* returning; which ſoon increaſed to that Pitch, that, by the Middle of *July*, ſhe could ſwallow nothing; and continued fifty four Days without eating or drinking, but often affected with the *Tetanus* more violent than formerly, and always inſenſible while the Fit continued. When

there was an Attempt made to thruſt down the above mentioned Inſtrument, the *Tetanus* returned with ſuch Violence, that it was thought ſhe was to die immediately.

After ſhe had faſted three or four Weeks, ſhe loſt firſt her Sight, (her Eye-balls being drawn upwards by the convulſive Motion), and ſoon after her Hearing; but knew her Friends who attended her by the Touch; ſo that when any of them took her by the Hand, ſhe would call them by their Names. And when ſhe had continued in that Condition about a Month, firſt her Sight, and, ſome Days after, her Hearing returned in their uſual Perfection.

About the 10th of *September*, ſhe called for ſome Ale, which ſhe freely ſwallowed, and continued to take it, and ſometimes Whey. She could eat Apples or Pears, raw or boiled; but no Bread, or any other ſolid Food. When ſhe had drunk Ale or Whey, ſhe fell into a Fit of Raving, which laſted an Hour or two; and when that was over, ſhe had the Uſe of her Reaſon perfectly well. The leaſt Diſappointment or Delay in doing any thing about her, brought always a Fit of the *Tetanus*.

In this Way ſhe continued till the 22d of *November*. From that, till the Month of *March* 1721, there was little Alteration: Only ſhe was much confined to her Bed, being taken up only once in eight or ten Days to have it made; and no ſooner was ſhe taken up, than ſhe had an Attack of the *Tetanus*, which did not leave her till ſhe was laid down again.

Soon after this, ſhe began to have hard Swellings behind her Ears, which remained there the

the 11th of *September* 1721, when the Doctor's Journal ends; at which Time ſhe could ſit up in a Chair ſome Hours, and could eat any Kind of Garden Stuff, but could not taſte Fleſh or Broth.

All the Time of her firſt and ſecond Faſting, ſhe declared ſhe had no Senſe of Hunger or Thirſt; and when they were over, ſhe had not loſt much of her Fleſh.

It muſt be acknowledged, that, during the firſt Courſe of it, ſhe had nouriſhing Injections of Broth, Zerry, and the Yolk of an Egg, once, ſeldom twice, in twenty four Hours; and the ſame during the firſt thirty Days of the ſecond Courſe: After which ſhe got none, the ſlighteſt Motion bringing a violent Fit of the *Tetanus*.

In both theſe Courſes of Abſtinence, her Pulſe was full, ſtrong, and equal, but ſomewhat ſlower than it naturally ſhould have been; her Breathing free and eaſy; her Urine like a healthy Perſon.

In the laſt Abſtinence, as well as in the firſt, ſhe was coſtive, ſo as to have no Paſſage a whole Month: which made it neceſſary to give her laxative Clyſters.

All that I could learn about her from the Time that the Doctor's Journal ends, is, that ſhe continued much in the ſame Way, ſubject to Returns of the convulſive Motions and *Tetanus*, and perfectly eaſy in the Intervals, no way ſenſible that ſhe had been in any ſuch Fit; though ſhe could always perceive when it was coming on. She continued to eat any Garden-ſtuff; but loſt her Fleſh. When talking to her Friends very eaſily, ſhe unexpectedly died, in the End of *De-*

cember 1721, without having made any Complaint, and without any convulſive Motion or Struggle.

A Promiſe ſhe had taken of her Mother, not to allow her Body to be opened, prevented any further Examination, than looking into the Part of the Gullet which had been convulſed; where nothing extraordinary could be obſerved.

XLIV. *An extraordinary* Abſtinence *during fifty Years; by the Rev. Mr.* Thomas Steill, *Miniſter at* Avendale.

BEing willing to gratify your Deſire, I hereby ſend you an Account of *Janet Young*, who lives in this Pariſh. Having heard ſomething extraordinary of this Woman, I went, upon the 29th of *Auguſt* 1729, and converſed with her, ſhe being then ſixty four Years of Age. She informed me, that ſhe fell from her Horſe into the Water of *Aven*, in the eighteenth Year of her Age, in the Month of *December*, having her *Menſtrua* upon her, which, being the firſt, never recurred; but that, ever ſince, till about four Years ago, ſhe had a frequent Vomiting of Blood, and even, in the Intervals, a continual Retching, or Propenſity to vomit, throwing up nothing.——She informed me, that, ſince her Fall, ſhe had taken little or no Meat; but lived, in the Summer, only on Whey, and, in the Winter, on Milk, or Milk and Water mixed, or pure Fountain-water; of which ſhe drinks pretty liberally, ſmoking very much Tobacco: To which Practice ſhe was obliged to betake herſelf,

ſelf, whenever ſhe felt that Retching, Boaking, or Propenſity to vomit, it being the only Mean ſhe found effectual to divert it. And, at the ſame time, ſhe told me, that, ſince the Middle of *May* laſt, ſhe had neither taſted Fleſh, Fiſh, Fowl, Meal, Broth, Herbs, Roots, nor any kind of Meat whatſoever. She voided little or no Excrements by Stool; and, for the Space of ſixteen Years, ſhe voided none but once in the Year; which was always in the Month of *March*, much like a ſmall Bit of Roll-tobacco, or one Globulet of Sheep-dung. She ſweat ſome, and at that Time ſleeped ordinary well.

I have made it my Buſineſs yearly, ſince that Time, to go and converſe with her, and found no Alteration till *Auguſt* laſt; when ſhe told me, that her Sleep was much broke by theſe violent Retchings and Inclinations to vomit, while, at the ſame time, ſhe throws up nothing.

This, Sir, is the ſhort Account ſhe gives of herſelf, aſcertained by a Woman who lived in the Houſe with her twelve Years, and confirmed by all her Neighbours; the Certainty of which I have no Reaſon to doubt, the poor Woman having no Temptation nor Encouragement to humour a Fraud or Deceit of any ſuch Kind, maintaining herſelf by her own Induſtry, neither expecting nor accepting any Benefit on that account. I am,

Sir, your moſt humble Servant,

Strathaven,
July 10. 1734. THO. STEILL.

We

We Mr. *Thomas Steill* Miniſter of the Goſpel at *Avendale*, and *Andrew Cochran* Surgeon in *Strathaven*, and Bailie of *Avendale*, do hereby declare, That, according to the beſt of our Knowledge, and the moſt certain Information we could have anent the Caſe of the forementioned *Janet Young*, what is above narrated, is a juſt and true Account of her Condition. In witneſs whereof, we have ſigned this Declaration, Date and Place foreſaid,

THO. STEILL.
ANDREW COCHRAN.

By a ſecond Letter from Mr. Steill *we are informed, that, ſoon after he had wrote what is above, the Woman took a Looſeneſs, and then ate a little thin Oat-meal Pottage every Day, her Retchings to vomit having left her; but lived a very ſhort Time this Way, having ſunk under her Diſeaſe, and died.*

XLV. *Practical Remarks on the* Sympathy *of the Parts of the Body; by the late Dr.* JAMES CRAWFORD, *Profeſſor of Medicine in the Univerſity of* Edinburgh.

AN exact and accurate Knowledge of the Structure and OEconomy of the ſeveral Parts of the human Body, and of the Influence each particular Part hath on another, is the principal Foundation both of Medicine and Surgery. For, if one throughly know the proper and peculiar Function of each particular Part, and the Connexion and Influence every one has

on

on another, it will be eaſy to determine the Effects that will reſult in every Part, upon the Application of any known Cauſe to any determined Place: And, on the other hand, it will not be difficult, from the Effects that appear to our Senſes in any Place, to riſe into the Seat of the Cauſe that produced them, how far ſoever it may be from the Place of that Appearance. And thus a *rational Phyſician*, proceeding from Things that are viſible, into thoſe that are hid, diſcovers where and how he is to apply his Remedies; while an *Empirick*, who had nothing to guide him, runs many Hazards of doing ill rather than good, or of doing a Thing rather wrong than right.

In outward Diſeaſes that appear to our Senſes, though we be not ſo liable to miſtake their Seat, or the proper Place to apply the Remedy; yet oftentimes the Effects appear in one Place, when the Source or real Cauſe lies in another. For, diſtinct and remote Parts communicating or conſenting with one another by the Intervention of long Nerves and Muſcles, a Part really whole and ſound may be pained, and loſe its Motion, from the Influence of another in which no *Vitium* appears.

For penetrating, therefore, into the diſtant and latent Sources of ſuch Diſeaſes, we muſt be well acquainted with the Origin, the Courſe, Inſertion and Motion of every Muſcle, and with the Origin, Diſtribution and Communication of the Nerves that belong to every Part. And this ſort of Knowledge makes the great Difference betwixt a knowing Surgeon, and an ignorant Mountebank or Barber. For the one, thinking every

every Diſeaſe has its Seat where the Effects appear, attempts to remove the Shadow, while the Body remains; and loſeth the Time of Cure, by a fruitleſs, and even hurtful Application of Medicines to a ſound Part: Whereas the other, knowing the Fountain of the Malady, plies it in its proper Place, and, plucking it up by the Roots, ſoon by the ſame Remedies ſets all to rights again.

I ſhall endeavour to confirm and illuſtrate what I have hinted at, by ſome Caſes that may be a Foundation for others of the ſame kind, and ſerve to explain many ſtrange *Phænomena* in outward Diſeaſes little taken notice of by any Author. But, for the guiding us to the underſtanding of what I intend, I muſt premiſe,

1. That a Part is affected by *Protopathia*, when it is eſſentially in itſelf leſed, and owes not its Origin to any Communication from another Part;

Or by *Idiopathia*, when, though it be eſſentially leſed, yet the Hurt was at firſt propagated to it from ſome other Part;

Or, *laſtly*, by *Sympathy* or Conſent, when the Part in itſelf is yet whole and ſound, and is only affected by the Fault of ſome other Part. It is of this laſt ſort only I deſign to ſpeak, though every leſed Action I am to propoſe more frequently ariſes from *Idiopathia* or *Protopathia*.

2. Diſeaſes by Conſent are propagated from a Diſtance, (in which Caſe only I ſhall conſider them), either by long Muſcles or Nerves.

3. If the Conſent be by Nerves, it is produced by ſome Leſion at their Origin, at ſome *Ganglion*, or in ſome other Branch of the ſame Trunk that

that goes to ſome other Muſcle, or perhaps by ſome Hurt of the Nerve in a diſtant Part of the ſame Muſcle.

4. If the Conſent be by a *Vitium* of the Muſcle, it muſt be leſed either in its Origin, or in ſome diſtant Part of its Courſe: For where-ever it be, the Effect will be moſt ſenſible and manifeſt about the Joint and Inſertion. The Tendon being the moſt ſenſible Part, the Pain is moſt felt there; and the Contraction or Relaxation appears beſt about the Joint.

5. In the *Conſent* both from Muſcles and Nerves, the *Vitium* is as well propagated backward from the Inſertion or Extremity to the Head or Origin, as forward from the Origin to the Inſertion.

6. A Joint or Member may continue contracted, either by the *Flexors* being in a ſpaſmodic Contraction, or by the paralytic Diſpoſition or Debility of the *Extenſors* or Antagoniſts, without any Fault in the Flexors; in which Caſe the Member is eaſily and without Pain extended by another, if an *Anchyloſis* has not happened.

7. For determining whether the Fault ariſes from the Muſcle or from the Nerve, examine if there be a Wound, an Ulcer, a Contuſion, or Tumor, about either of their Origins or Courſes. If this Way diſcover nothing, obſerve if this be the only Muſcle affected: And if ſo, you may generally conclude the Cauſe to be in the Muſcle; for ſuch a hidden Fault in a Muſcle is ſeldom propagated to another, except it have a large *Aponeuroſis*, or confound its Tendon with ſome other. But if the Nerve be affected, it communicates the ſame Effect to all the other Muſcles

Muſcles that have Branches from the ſame Nerve.

8. If by none of the foregoing Signs you diſcover the Origin and firſt Seat of the Diſeaſe, you may judge it *topical*, or *protopathick*, or *idiopathick*, to the Part affected.

9. A Diſcovery of the Source of the Diſeaſe directs you to the Place where to apply your Medicines. In a *Protopathia* they muſt only be applied to the Part affected; in an Affection by *Conſent* only, to the Cauſe or Root of the Diſeaſe; and in an *Idiopathia*, both to the one Place and the other, and that according to the Degree or Danger of either. But the following Caſes being all made, or ſuppoſed to be Affections by *Conſent*, the tracing them to their Origin ſufficiently directs to the Place of Application.

I. A Palſy or *cynick Contraction* of the Under-lip by *Conſent*, has its Origin either in the Clavicle and Neck, the Origin and Courſe of the ſubcutaneous Muſcle called *Platyſma myoides*; or at the third *Vertebra* of the Neck, where the Nerve of this Muſcle has its Origin; or, laſtly, from the third Branch of the fifth Pair of Nerves, which, paſſing through a Hole of the Under-jaw at the Side of the Chin, gives a Branch to this Muſcle. When, by the Signs formerly given, you find the true Origin of the Diſeaſe, you are there to make your Applications.

II. If the Under-jaw cannot move downwards, it ariſes either from a Compreſſion, or Debility, or Palſy of the *Depreſſor* Muſcles of the lower Jaw in their Origin or Courſe, or from the Contraction of the *temporal* Muſcle or *Maſſeter*; or, laſtly, from the Affection of the third Branch of the fifth Pair of Nerves that beſtows Branches on

theſe

theſe Muſcles, or of the *Portio dura* that communicates three times with this Branch of the fifth Pair. The firſt Seat of the Diſeaſe, found by its Signs, directs to the Place of Application.

III. Upon a Stroke or Tumor on the Breaſt, there aroſe a Pain that was felt in the *Os pubis* and *Teſticles*, with an Inability to move the Arm inwards. The exterior oblique Muſcle of the Abdomen being hurt, or ſtretched in its Origin on the Breaſt, gave the greateſt Pain at the *Os pubis*, where its ſenſible Tendon is inſerted; and the Tendon being ſtretched by preſſing on the ſpermatic Veſſels and *Cremaſter*, that paſs through it, cauſed the Pain of the Teſticles; and the pectoral Muſcle being alſo hurt, it could not move the Arm inwards. The Application muſt be here made to the firſt Cauſe. A Stroke or Tumor on the fifth *Vertebra* of the Back, where the Nerve that moves the *Pectoral* and exterior oblique Muſcle of the Abdomen has its Origin, may create theſe Symptoms in the ſame Places; but the *Deltoid*, *Serratus minor anticus*, *Aniſcalptor* and *Obliquus inferior*, which receive Branches from the ſame Nerve, would alſo be affected.

IV. A Tumor or Stroke on the *Os ſacrum* produces ſometimes an Inability to move the Arm down or backward, by hurting or compreſſing the *Aniſcalptor* that performs that Motion. The ſame may ariſe from the Affection of the Nerve that moves the ſame Muſcle; but then the *Pſoas*, *Complexus*, *Splenius*, &c. that receive Branches from the ſame Nerve, would be affected.

V. If, after a Stroke on the fifth *Vertebra* of the Back, the Neck could not bow but with great

Pain, the *Rectus colli* that bows it riſing from this *Vertebra*, being hurt; if it had ariſen from the Compreſſion or ſtretching of the Nerves, the *Pectoral*, *Serratus minor anticus*, *Aniſcalptor*, and the *Obliqui abdominis*, that have Branches from that Nerve, would alſo have been affected.

VI. If one cannot bow the Arm, it ariſes from the Head of the *Scapula*, or from the *Humerus*, where the *Biceps* and *Brachiæus internus* have their Origin or Courſe. If it come from the Origin of the Nerves in the Neck, the Flexors of the Thumb and Fingers will be affected.

VII. If one cannot bow the Thigh, it ariſes from the Origin of the *Pſoas*, affected by ſome Tumor or Stroke on the firſt *Vertebra* of the Loins, or from a Compreſſion of the Origin of its Nerve in the ſame *Vertebra*. In this Caſe the Muſcles of the *Abdomen*, *Aniſcalptor*, and *Sacrolumbalis*, would be affected. The *Iliacus internus* may hinder the ſame Motion. If it ariſe from its Nerve, the *Gluteus major* will be affected. If it move not inwards, the *Triceps* from the *Os pubis*, or its Nerve which communicates with the *Gracilis*, *Iliacus*, and two *Obturatores*, is affected. If it extend not, the *Glutei* or the Nerve which riſes from the firſt Pair of the *Os ſacrum*, and communicates with the *Iliac* and Muſcles of the *Abdomen*, are affected.

VIII. If one cannot croſs his Legs, the Fault may lie in the *Coſta* of the *Ilium*, where the *Sartorius* has its Origin; or at the third *Vertebra* of the Loins, the Origin of its Nerve; and then the *Vaſtus externus* and *Crural*, having Branches from the ſame Nerve, will be affected. If the

Tibia

Tibia bow not, the Fault may lie in the *Iſchium*, where the *Biceps*, *Semimembranoſus* and *Seminervoſus*, have their Origin; or from the laſt *Vertebra* of the Loins and the *Os ſacrum*, which afford the Nerves to theſe Muſcles. The *Sartorius* and *Triceps* have Branches of the ſame Nerve with them.

Laſtly, If the *Tibia* extend not, the Cauſe may be in the *Coſta* of the *Ilium*, where the *Rectus* and *Faſcia latá* ariſe; or in the *Trochanter major*, *minor*, or the intermediate Space betwixt them, where the *Vaſtus externus*, *internus* and *cruræus*, that extend the *Tibia*, have their Origin; or in the *Vertebræ of* the Loins and *Os ſacrum*; and then the other Muſcles of the Thigh and Leg, that have common Nerves with thoſe, will be affected.

IX. If one cannot extend the Foot, or pull the Heel upwards, the *Gaſtrocnemii* are affected in the Ham or in the Calf of the Leg; or the Nerves of theſe Muſcles are affected in their Origin in the laſt *Vertebra* of the Loins and *Os ſacrum*. In this Caſe the Flexors of the *Tibia*, the *Triceps*, *Tibiæus poſticus*, and the two Flexors of the Toes, that receive Branches from the ſame Nerve, are affected. If the Foot move not inwardly, the Fault lies in the Head of the *Tibiæus Poſticus*, or in the laſt *Vertebra* of the Loins and *Os ſacrum*; which will be accompanied with the Debility of all the Muſcles juſt now named, becauſe of their Communication of Nerves. If the Foot cannot bow, it has its Origin at the Head of the *Tibiæus anticus*, in the external Head of the *Tibia*; or in the Top or Middle of the *Fibula*, where the *Peronæus anticus* riſes; or

in the laſt *Vertebra* of the Loins and *Os ſacrum*, where the *crural Nerve* has its Riſe. In this Caſe alſo all the Muſcles laſt named will be affected too.

I omit the other Affections of the Feet, as I did thoſe of the Hands, becauſe their Muſcles are not placed at any conſiderable Diſtance from their Inſertion; and that all their Nerves come from the *crural*, as the other did from the *brachial* Nerves.

I might, with a little more Pains, give many other Inſtances of the great *Sympathy* and Conſent that the Parts of our Body lying at a Diſtance have with one another, by the Intervention and Communication of Muſcles and Nerves; but theſe I think ſufficient to convince us how dangerous it is to truſt the Cure of the Diſorders of our Body to one that is ignorant of its Parts and Structure. And ſeeing we find no body ſo fooliſh as to truſt one with the mending of his Watch, that knows nothing of the Wheels and Springs whereby it goes, is it not ſtrange, that ſo many can fearleſsly venture their Joints and Members into ſuch Hands, where the Springs are as much more intricate as they are more valuable?

XLVI. *Hiſtories of ſucceſsful Indulgence of bad Habits in Patients*; *by* ALEXANDER MONRO, *P. A.*

THE old Axiom in Phyſic, That ſudden great Changes are dangerous, has been diſputed by ſome Moderns, who adviſe to give over immediately bad Habits. I have ſeen numerous

merous Examples where it was neceſſary to have regard to them, and even to indulge Patients in them, if we expect to make a Cure. At preſent I ſhall mention only three.

I. A Cook, in an Eating-houſe, quarrelling with a Servant-maid, ſhe ſtruck him with a large Knife, and cut through a great Share of the right *Pinna* and *Septum* of the Noſtrils; ſo that it hanged down towards his Lip. He had bled a long time, and was very faint by the Loſs of Blood, before his Noſe was ſtitched. His Wife was allowed to give him ſome White Wine among the Water-gruel he was ordered for Drink, or to make ſome Sack-whey for him. He, however, continued very low, and faint with Sickneſs at his Stomach, and Head-ach, for three Days; till his Wife told me his ordinary Way of living was, to drink a good deal of Ale, Wine, and Brandy, every Day; and, unleſs I would allow her to give him more and ſtronger Liquor, ſhe did not expect he would recover. I did not forbid her; which ſhe interpreted an Allowance, and gave a Gill or four Ounces of Brandy with ſome of our ordinary Ale. He was much better next Day; and, with this Doſe every Day, recovered daily, till he was quite well.

II. A Man having broke the Bones of his Leg, after the Fracture was reduced, I ordered him to have no Drink given him, except Water and Milk, Water-gruel, or ſuch like. He did not ſleep well in the Night. Next Morning I found his Pulſe very quick, but low, and with Complaints of Pain in his Head, Thirſt, *&c.* Imagining ſome drunken Companions I ſaw come to viſit had given him ſtrong Liquors, I ordered

him to be more ſtrictly watched by ſuch who I was ſure would obey me; and he was kept to the low Diet rigorouſly. He did not however ſeem relieved at Night, ſleeped none all Night; and next Morning he was altogether delirious, got out of Bed, kicked away the Box in which his Leg had been put, his Tendons were ſtarting, and he ſcarce knew any Perſon; his Pulſe at the ſame time intermitting, and being very low. One then preſent, whom I knew to be a very compleat Drunkard of the low Claſs, aſſured me I would kill him if I did not allow him Ale and Brandy; for that the Patient had for ſeveral Years outdone him in irregular Living. I conſented to allow a little. That Night he was much better, and next Morning was altogether free of Fever, Dilirium, *&c.* when they acknowledged he had got a *Scots* Quart of Ale and a Gill of Brandy in the preceeding Day, which had made him ſleep well and ſound. This daily Allowance of Ale and Brandy then he had all the Time of his Cure; which went afterwards on without the leaſt Accident.

III. A Diſtiller of Spirit of Wine at the *Weſt-Port*, ſitting upon the Edge of a Tub, into which the boiling Remains of a Stillful of Wine had been put, ſlid back into it, by which his Hips, Thighs, *Scrotum*, *Penis*, and Belly, were miſerably burnt, the Skin of theſe whole Parts turning quickly black and hard. I endeavoured to promote a Suppuration by Scarification, ſuppurating Ointments and Poultices; and, as his Pulſe was quick, ordered him to be blooded, and kept on a low Diet. Next Day he was much diſpirited, with great Anxiety, and a low quick

Pulſe.

Pulſe. The third Day he was near as bad as what I mentioned the former Patient to have been, when his Wife inſiſted to be allowed to give him of the Spirits he diſtilled; which he got, and ſoon became better, the Suppuration coming on the Teguments, which cured very well; his Wife, near the End of the Cure, acknowledging ſhe had given a Mutchkin or Pound of Spirits every Day.

XLVII. *Unexpected Cures*; *by* ALEXANDER MONRO, *P. A.*

IF Practiſers in Phyſic and Surgery have ſometimes uneaſy Minds on account of Patients, the Nature of whoſe Diſeaſes they cannot judge with Certainty; if they are diſappointed now and then in the Effects of Medicines; and if they have the galling Mortification of the Sick dying unexpectedly, they have, on the contrary, frequently the Comfort and Pleaſure of being ſurpriſed with the great Relief which their Patients, in very obſcure, or even in Diſeaſes which they are ignorant of, receive from Medicines, which either a very diſtant Analogy to ſome known Diſeaſe, or the Neceſſity of mitigating ſome urgent Symptom, have made them preſcribe; nay, the Event ſometimes is proſperous when the Medicines are differently applied, or have other Effects than the Preſcriber intended. Though People ſhould be very cautious in laying down any general Rule in Practice, and ought not to found it on one or two Obſervations; yet I muſt think ſuch *unexpected Cures* as

I have hinted at, deſerve to ſtand on Record, that, if the Medicines employed are not of a very offenſive Nature, they may again be tried in ſimilar Caſes; ſo that ſick People may have ſome more Chance for their Recovery than the common Methods give. As a Specimen of ſuch Caſes, I ſend you the following Medley of practical Obſervations. If they are thought uſeful, I can furniſh you ſeveral more; and dare ſay, every one of the Gentlemen of your Society can add to the Number.

I. A middle-aged healthy Man having bruiſed the Extremity of the *Penis*, the Part of the *Prepuce* where the *Frænum* of the *Glans* is, was raiſed into a large *cryſtalline Tumor*. Topical aromatic Fomentations and *Suffumigia* being applied to it, and Cathartics being given, without its yielding, a ſmall Seton was put through it, with the View of allowing ſome of the watery Liquor to ouze out, and of bringing on a gentle Suppuration. Inſtead of this it occaſioned ſharp Pain, and a violent Inflammation; which made it neceſſary to take out the Cord, and to apply an emollient Poultice of Milk and Bread. Next Day after this the Tumor was greatly diminiſhed; and the ſecond Day it diſappeared, without a Return.

II. A young Man had a great many pale-red Excreſcences, of a very unequal Surface, with ſmall Necks on the interior Side of the *Prepuce*; and when the *Prepuce* was turned back, *Coxcomb* Excreſcences were likewiſe ſeen on as much of the *Glans* as he could uncover. The Account which he gave of his Diſeaſe to Dr. *James Dundas* and me, was, That, having a ſmall Wart on the

the Edge of the *Prepuce*, he cut it away with a Razor; ſoon after which theſe Excreſcences began to appear. *Mercurial Ointments*, *Aſtringents*, *Eſcharotics*, and ſeveral other Medicines, had been tried in vain, and he had undergone ſix Weeks Salivation without any Benefit; tho' he averred ſolemnly, that he was ſure they were not owing to any venereal Cauſe.

I tied a Silk Thread very tight round the Neck of one of them; he complained of ſharp Pain while the Nooſe was drawing, which ſoon ceaſed; and in two Days the Tumor dropt off, leaving the Surface of the Part it roſe from ſmooth and ſound.——I deſired a young Surgeon, who had ſeen me make this Ligature, to take the other Excreſcences away in the ſame Way. When this young Gentleman attempted next Day to put a Ligature on one of theſe Excreſcences, he was timorous, and the Patient was not obſequious; ſo that the Ligature was not made tight enough to mortify the Tumor. The Patient felt very ſharp Pain all that Day; and by next Morning a very conſiderable Inflammation was raiſed; for which he was blooded plentifully, and emollient Fomentations and Poultices were applied to the Part. After two Days the Inflammation abated, and the Excreſcences were all conſiderably diminiſhed; and, as the Inflammation went off, they ſhrivelled: So that, after eight Days, during which the Emollients were continued, it could not be known where the Excreſcences had been.

Whether was it the Inflammation or the emollient Applications which made the Cure in theſe two Caſes? In my Opinion it was the Inflammation;

flammation; and I am confirmed in it by the Succeſs which I have ſeen of ſtimulating Medicines in ſlow cold Swellings.

III. A Man who had been ſubject to the Gout, was by Accident burnt ſuperficially in the Face and Hands. After the Burnings were all ſkinned, a ſpongy Excreſcence, the Baſe of which was equal to a Sixpence, roſe out from the Point of his Noſe; and ſuch another, as broad as a Shilling at its Baſe, roſe out from the right Cheek. They were both of a pale red Colour, and of a granulated Surface, throwing out from imperceptible Pores a thin Liquor, which fell down in Drops ſo faſt, that a conſiderable Quantity of it could have been collected in a ſhort Time. After different Plaiſters, Ointments, Aſtringents, *&c.* had been tried to no Purpoſe, I covered the Excreſcences with the fine Cotton of old Linen, ſcraped with a Kniſe, and wet with *Alcohol.* I deſired the Cotton might not be taken off, but that it ſhould be wet three or four Times a Day with the Spirit. After this Application, the ouzing of Liquor decreaſed, and in two Days ceaſed altogether. The Cotton adhering to the Excreſcences, they ſhrivelled, and at laſt became ſmooth and plain with the other Parts of the Skin; leaving only a little Redneſs for ſome Time.

IV. A young Man of a weak Conſtitution, and thin Habit, having fallen from a Height, was bruiſed in a great many Parts of his Body, and particularly in the *hypogaſtrick Region.* He complained ſoon after of a ſharp Pain in the *Penis*, and Region of the Bladder. Thoſe he adviſed with ſuſpecting theſe Pains might be cauſed by ſome

ſome Remains of a virulent *Gonorrhæa* which he had two Years before, injected ſome acrid Medicines into the *Urethra*, which increaſed the Pain, and occaſioned a conſiderable Inflammation in the *Penis*. When the Inflammation was removed, he had great Difficulty in making Water, with ſharp Pain along the whole *Urethra* when it did paſs. He then took ſeveral Doſes of *Sweet Mercury*, drank the Decoction of the Woods; and continued ſome time the Uſe of gummous Pills, with ſome Grains of Mercury in them. The Symptoms becoming however worſe I was conſulted about him four Months after his Fall.

He complained of a torturing Pain at the Root of the *Penis*, and in the *Glans*, when he attempted to make Urine, which let fall a white furfuraceous thick Sediment in great Quantity when it cooled. I adviſed mild mucaginous Medicines, and an emollient healing Injection, with Fomentations to the pained Part. Theſe made him a little eaſier, but did not remove his Diſeaſe; and he was ſeized with feveriſh Paroxyſms, which had the full Type of Ague, but without regular Returns. Theſe waſted his Strength and Fleſh ſo faſt, that there was a Neceſſity to ſtop them; with a View to which, and to his original Diſeaſe, the following Electuary was ordered: ℞ *Pulv. patrum, Drach.* ii. *Gum Arabic. Drach.* i. *ſem. Sal. Nitr. Drach.* i. *Pulv. milleped. unc. ſem. Sal. Jov. Londin, ſcrup.* i. *Syrup. diacod. q. ſ.* Of this he took the Bulk of a Nutmeg twice a Day. The aguiſh Paroxyſms went off gradually, and the other Symptoms became milder, till he was free of all his Complaints in

ſome

ſome Weeks; and he has continued free of them ever ſince.

V. *Alexander Strachan*, Gardener to Mr. *Erſkine* of *Grange*, had a Colick, which continued a Day in the Beginning of *February* 1734; after which a painful Tumor was obſerved towards the left Side of the epigaſtrick Region, which ſoon increaſed, and extended itſelf over that whole Region. He took ſome purgative Medicine, after which he had a conſtant *Diarrhœa*.

When he was received into the Infirmary 6th *March* 1734, a Suppuration ſeemed to be ſo far advanced in the Tumor, that the Surgeons felt a Fluctuation of Liquor lodged deep, and the left Part of the Tumor pointed outwards. He complained of a ſharp Pain in the left Shoulder; and the Skin of his Face had that leadiſh Colour which is almoſt peculiar to People whoſe Livers are ſuppurated. His Pulſe was quick and low. He had no Deſire for Food, and, upon taking it, the Pain of the *Epigaſtrium* was much increaſed. He had perpetual Thirſt; ſleeped ill in the Night, and ſweated much in the Morning, with a *Diarrhœa* ſtill upon him.

To promote the Suppuration, a Poultice of Oat-meal boiled in Water with ſome *Baſilicon*, and bruiſed raw Onions, was applied to the *Epigaſtrium*, and renewed thrice a Day. Some Drops of *Laudanum* were given at Night to ſtop the *Diarrhœa*, and to procure Reſt. Mild Food and Drink were ordered.

The Suppuration ſeemed to advance outwards for four Days; the Doſe of the *Laudanum* being gradually increaſed to check the *Diarrhœa*, which

which frequently returned, but without any *Pus* in his Stools.

On the fifth Day the Tumor was evidently diminiſhed, ſofter and leſs painful; but he was faint, for which he had Sack-whey allowed him to drink ſometimes.

His Poultice and *Laudanum* were continued, the Tumor gradually diminiſhed, and his hectic Symptoms went off, without any obſervable Evacuation of *Pus*; ſo that, *April* 26. he was diſmiſſed heal and ſtrong.

VI. A Child eight Months old was ſuddenly ſeized with violent *epileptic Fits*; after having had ſeveral, was let five Ounces of Blood at the jugular Vein; and ſoon after, being put into a Cradle, covered over with a Cloth, loſt a conſiderable larger Quantity of Blood, the Cloaths about her being all wet, and the Child in a Faint, and very pale. She continued weak and pale ſeveral Days; but never has had any Return of the *Epilepſy*, though ſhe has ſince that Time undergone all the common eruptive Diſeaſes.

VII. A Woman in the Decline of Life, and of a broken Conſtitution, had been ſeveral Weeks in a rheumatic Fever; out of which ſhe narrowly eſcaped, after repeated Blood-lettings and other Medicines. Two Years after ſhe was ſeized with the ſame Symptoms which had appeared in the Beginning of the former Fever, to wit, Anxiety, Thirſt, Vomiting, Pains of the whole Body, and particularly of the Head, with a high quick Pulſe. She was taken ill in the Morning, and in the Evening fourteen Ounces of Blood were let at a Vein of the Arm; which gave her little or no Relief. In the Night-time the Blood

burſt out again at the Orifice of the opened Vein, and, beſides wetting all the Bed-cloaths, was lying in Clots at her Side before it was taken notice of. A clean Bandage being then applied, ſhe fell aſleep, and awaked next Morning free of all Complaints.

VIII. In *January* 1739, a ſharp Pain ſtruck into my right Eye, then gradually ſeized all that Side of the Face, contracted the Eye-lids, made the Tears ruſh out, and affected all the Teeth of the Upper-jaw. It began between Ten and Eleven o'Clock in the Morning, increaſed till about Four in the Afternoon, decreaſed till Six, and then went off, without a critical Evacuation of any kind, ſo far as I could obſerve. In the *Paroxyſm* my Pulſe had no Diſorder in it; and in the Intervals I was as well as ever. The Inconveniency of Confinement at that Seaſon of the Year, and the Hope of each Fit being the laſt, made me ſuffer theſe periodical Pains ten Days, without trying to remove them by any Medicine.

The Pain increaſing daily, and making me at laſt unable to do my Work, I let ten Ounces of Blood, and took a Vomit a little Time before I expected the *Paroxyſm* would begin. The Vomit operated ſeverely, but did not prevent the Return of the Pain; which continued till the Medicine began to go downwards, when I was relieved: And, having purged twenty times before Night, I had no more Return of the Diſeaſe.

Since that Time I have cured ſeveral of this Diſeaſe, by giving them a Vomit, and a briſk Purgative ſoon after this Operation was over, if there

there was no Appearance of the Emetic's acting alſo as a Purgative.

IX. A Man brought a *Quartan Ague* and the *French Pox* from *England*. The Ague was in vain attempted to be cured by the common Remedies; and, in the mean time, the Pox advanced, the nocturnal Pains increaſed, and the foul Ulcers in his Throat ſpread. His Phyſician (who is one of your Number, and from whom I have this Account) gave him five Grains of *Sweet Mercury* at Night, immediately after the Fit of the Ague was over; repeated the Doſe next Morning and Evening, and the Morning of the following Day. After taking theſe four Doſes of *Mercury*, he had a Fit of the *Ague*, which was more ſevere than any he had formerly undergone; the Fever being higher, with *Delirium*, but without any other bad Symptom. After the Fit was over, the *Mercury* was repeated as formerly, till the Salivation roſe. He never had more Appearance of the Ague; and the venereal Symptoms diſappeared by the Uſe of the *Mercury*.

I was willing to borrow this Caſe, becauſe, ſo far as relates to the *Ague*, it was an unexpected uncommon Cure of a Diſeaſe little known in this Country; the *Quartan Agues* not having been ſeen here; except produced in other Countries, untill within the laſt ten Years; in which they have been obſerved in ſome Parts of the Country, but have not been general.

XLVIII. *Of nervous Fevers: by* Ebenezer Gilchrist, *M. D. communicated by Dr.* William Cochran, *Fellow of the College of Phyſicians in* Edinburgh.

SOme further Experience and Reflexion have confirmed me in the Notion I formerly communicated of *Nervous Fevers* (*a*), both as to the Diſeaſe, and the Method of Cure. Allowance, indeed, muſt be given for what could be then only rudely ſuggeſted in the Beginning of an early Practice. The following Thoughts will render that Eſſay more compleat. I give them in Form of looſe Hints, to be improven or rejected according to every one's Reaſon and Obſervation. And, if any ſeeming Contradiction, Obſcurity, or want of Connexion, ſhall appear, I muſt intreat the Reader's Favour; becauſe, in limited Undertakings of this kind, there is not Room for a large Explication of Things.

The Subject, in the Manner I have treated it, is difficult; having more in it than is commonly imagined; and the Path is hitherto, in a great meaſure, untrodden. Though a great deal has been ſaid upon Fevers, here there is ſtill much wanting. A Diſeaſe ill underſtood in Theory, muſt leave us in great Uncertainty, and will introduce frequent Miſtakes in Practice. Whether this Aſſertion is true with reſpect to the Subject in hand, muſt appear from the Obſervations now to be made; wherein I have preſumed once more to offer ſome other and more determinate Proofs and Conſiderations relating to it, in

(*a*) Med. Eſſays, Vol. IV. 23.

in order to ſet ſome Things in the cleareſt Light I am able. And this Attempt, even though it ſhould prove unſucceſsful, will notwithſtanding I hope be encouraged. If the Principles and Facts ſhall be found true, and the Reaſoning juſt, there is a Method laid down, and Matter, for a much more regular and extenſive Performance. To give this all the Advantages poſſible, I have been obliged to bring many Things into narrow Bounds; which makes the whole too crowded. But moſt of what is ſaid, may be conſidered as a Text, or Inſtitutes, hereafter perhaps, in a proper Time and Place, to be enlarged on. And, that it might anſwer more fully the Purpoſe of this Collection, I have, whereever an Opportunity has offered, thrown in ſuch uſeful Remarks as naturally occurred, were ſome way neceſſary to ſtrengthen the Argument, and have a plain Tendency to the Improvement of Medicine in general.

There are many who cannot conceive of a Fever, without the Notion of Fire, Heat, or ſome very active irritating Cauſe; and, in many Fevers, I own, there is good Reaſon to have ſomething of this kind in View: But our Fever has ſomething peculiar in it, which neither Antients nor Moderns perhaps have deſcribed, if at all thought of. The *Cauſus* of the Antients, however ſimilar in ſome Symptoms, appears to be a very different Diſtemper. And though frequent Mention is made of Fevers, which ſome will inſiſt ſhould be ranked with ours; theſe, I apprehend, have happened in particular Habits; at leaſt, there is not a regular poſitive Hiſtory handed down to us of them as a Conſtitution.

I muſt therefore, till I am better informed, continue to think, that they knew as little of this Fever as of our modern Diſeaſe, *Lowneſs of Spirits*. Theſe two have ſuch a ſtrong Likeneſs and Connexion, that I always conſider them as one; only with the Difference of acute and chronical. The one is to the other what a ſimple Hectic is to a continual Fever: So that Vapours may be called an habitual nervous Fever, and a nervous Fever, acute Vapours. As the Reſemblance is continually, in every Inſtance almoſt, preſenting itſelf, a Parallel equally entertaining and inſtructive might eaſily be made betwixt them. They would mutually ſupport and illuſtrate each other; which would give us a juſter Ætiology of both Diſeaſes, aſſiſt us likewiſe in the diagnoſtic and prognoſtic Parts, and point out more certainly the moſt proper curative Intentions in all, but eſpecially in delicate and perplexed Caſes.

As *our* Fever ſeems to be peculiar to this Age, it is not a little ſurpriſing that much more has not been ſaid upon it. Some ſcattered Hints are to be found in late Authors, both juſt and ingenious, but not ſufficient to make out a Syſtem of the Diſeaſe. Nothing therefore but diligent Obſervation and cloſe Attention, can let us into the Myſtery of it, both in its Nature and anomalous Changes. I call them *anomalous*, becauſe, however agreeable to the Genius of the Diſtemper theſe Changes may be, we can form no Notion of them from the Standard in other Fevers; which, from the Beginning to the End, proceed in one conſtant Tenor; and

for

for moſt part we know what is to happen in them.

Formerly I thought I had Reaſon to place the Cauſe of the Fever, as it was then, in a *Lentor*, with ſome Degree of Inflammation, and a *Spaſm* conſequent of them; from which the Degree of Malignity was to be determined. I thought too, that even what appeared to be a ſimple inactive *Lentor* might be equally malignant, as when it is attended with either Inflammation or Acrimony; which I advanced, to ſhew the Neceſſity of diſtinguiſhing betwixt the Fever and *Delirium*. To illuſtrate, then, and confirm theſe Things, let us ſuppoſe the firſt Degree of the Fever proceeding *viz.* from a *Lentor* without Combination, and, entering as far as we can into the Nature of of Things, endeavour to trace the Diſeaſe thro' ſome of its Intricacies.

Though this firſt Degree of the Fever was ſeldom mortal; yet ſometimes, by reaſon of a *Delirium* that came on at an uncertain Time, and without giving Warning, it became dangerous and ſurpriſing. A mild *Viſcid* in the Blood, ſo I chuſe to call it, but ſtill of the rheumatic kind, while it can be circulated, will excite a Fever of a mild kind; by which Nature endeavours to attenuate and reaſſimilate the offending Matter. When it is more difficultly circulated, or apt to form Obſtructions, it eaſily fixes upon this or the other Part, ſo as to occaſion Pains, wandering or more fixed; univerſal ſlight Rheumatiſm, *Lumbago*, *Sciatica*; and in the Breaſt a ſlighter Peripneumony or Pleuriſy. Such was the Conſtitution in many Caſes, where I was willing to ſuppoſe this ſimple *Lentor* only. Theſe

Pains

Pains and Ailments came on at very uncertain Times of the Diſeaſe, ſooner or later, and were eaſily changed one into another: *e. g.* A fixed *Iſchiatic* Pain going off, was ſucceeded by a *Delirium*; or Pains of the Sides went off in more univerſal Pains. A *Delirium* came on ſometimes the firſt or ſecond Day; at other Times not till the Diſeaſe was ſuppoſed to be at its Height: And when, in the Progreſs of it, I judged the Patient ſhould have been ſafe from this Irregularity of the Diſtemper, he was brought into the greateſt Danger. Nay, the ſame Diſeaſe ever varying, was ſometimes an apoplectic Fever, and ended in a Palſy.

The Matter of the Diſeaſe, in ſo many Shapes, muſt have been very moveable; but not eaſily attenuated, from its being either too ſizy, or the Fever too low to diſſolve it. But, by a juſt Degree of the Fever continued, this Viſcid diſpoſed to form Obſtruction in different Parts, and thereby give the Idea of a rheumatic, pleuritic, or other Fever, was ſometimes diſlodged, and the Diſeaſe returned to its firſt Type, a ſimple Fever. At other times, though this obſtructing Matter was diſlodged, it would have been thrown upon the Brain; and at a Time when I expected a Concoction of the Matter, and Termination of the Diſeaſe. As this Matter, therefore, is eaſily tranſlated to the Brain, and at very uncertain Times, it ſhews the Neceſſity of doing ſomething early to attenuate it, and break the Fever; which of itſelf, without a *Delirium*, was often eaſily ſubdued. And we are carefully to watch the Changes of the Diſeaſe, even that which we expect to be a *Criſis*; which, inſtead of being ſalutary,

ſalutary, may be a Tranſlation to the Brain itſelf; or rather all the animal Powers weakned by the Fever, and the Matter of it not ſubdued, it is here depoſited. What Apprehenſion then muſt we have of this Change, or of the Diſeaſe ſubſiſting in this Manner? It is now very different from what it was: the original Form and Idea of the Fever being loſt in that of a ſimple Obſtruction of the Brain without a Fever.

We are now then to ſuppoſe an inactive *Lentor* loading and obſtructing the Brain, and not a ſufficient Degree of Fever to reſolve it: For I judge the Fever to have ceaſed when the Matter of it was thrown upon the Brain. The Patient, in this Caſe, is without Fever; or what Fever he has, is ſymptomatical: The Pulſe is low, flaccid, and very little increaſed in Quickneſs: He lies without Senſe of Pain or Sickneſs; raves without Furiouſneſs, when awake; but for moſt part ſleeps compoſedly. This Sleep is properly a *Vetternus*, or the Sleep of old People. Nor muſt you be ſurpriſed when I ſay, that ſuch die of old Age; which happens for Want of a due Circulation into the extreme Parts, from the Brain not doing its Office. No Matter what that Office is, or from what Cauſe it may be hindered; the Effect is ſtill the ſame; and there is only required an appropriated Method of Cure.

This Obſtruction, happening in a low State, or where the Circulation cannot be raiſed high enough to reſolve it, produces a great Variety and Perplexity of Symptoms, which cannot be accounted for from the Fever that has preceeded; for that is now much over. While the Idea of the Fever only is retained, the Appearances

will,

will be myſterious and deluding; and we ſhall never be able to ſpeak rationally and intelligibly of them: But, if we preſerve the Notion of the Fever in that Degree in which it exiſts, and principally of an Obſtruction of the Brain too, we ſhall know what Symptoms ariſe from the one or the other, or both conjunctly.

When this Obſtruction then is formed, which, with reſpect to the Fever, we ſuppoſe a *Criſis*, the Secretions made in the Brain for the Uſe of the ſeveral moving Powers through the Body, will be diſordered and leſſened, or their Action, whatever that is ſuppoſed to be, is prevented. Theſe Powers thus deprived of the full and neceſſary Supplies for Motion and Senſation, that univerſal Mechaniſm, *viz.* a Fever, which is employed in preparing and carrying off the Matter of Diſeaſes, is not performed. And though there may be ſome Remains of the original Fever while this Mechaniſm is not performed, it is the ſame thing, at leaſt for the Time, as if there was no Matter to be ſubdued; that is, while the Brain is thus oppreſſed, and hindered from doing its Office, all the neceſſary Motions are in ſome ſort ſuſpended, and Nature remains in an inert, incapable State; which is the ſame as if there was no Diſeaſe. We may conceive of this from the Notion we have of a State wherein all Senſe of Pain and Sickneſs is taken away by Opium.

But though, from the Cauſes mentioned, a right Degree of the Fever is prevented; yet, if there is any ſmall Remains of the original Diſeaſe, the Matter of it, ſo long as the Circulation continues, will be ſtill accumulating, and Nature

ture will be forced to exert her utmoſt Power to conquer theſe Remains. And I have obſerved plain Paroxyſms, every ſecond, third or fourth Day, or twice in three Days, according to the Kind and Quantity of the Matter thus accumulated. From this we flatter ourſelves with a Change of the Diſeaſe to intermittent: The only Chance indeed the Patient has to overcome it. I have never met with one where this ſucceeded. The Reaſon is plain. This Paroxyſm is regular, has encouraging Signs, even a laudable Sediment in the Urine. All this may happen notwithſtanding an Obſtruction of the Brain; which, ſtill continuing, daily weakens the animal Powers; and every Paroxyſm adds to the Obſtruction, till the Patient, languiſhing, dies, without receiving any Benefit by this expected Change of the Diſeaſe from continual to intermittent.

This is the loweſt kind of the Fever, for which I was never ſo lucky as to find a Remedy; proceeding from a *Lentor*, the moſt inactive, moveable, but not eaſily diſſolved, and that from the Want of a due Force of Circulation. It may indeed be diſlodged, but not ſo attenuated as to prevent its forming Obſtructions anew.

Having deſcribed in ſome meaſure this kind of the Fever, and accounted for ſome of the many Appearances of it, when proceeding from the moſt ſimple Cauſe; it may be eaſily imagined, what yet greater Variety of Symptoms will happen when there is a Combination of Acrimony and Inflammation. Reaſoning thus from the more obvious Cauſes of ſuch a Fever, and from the Method of Nature in other Diſeaſes, where

there

there is a plain Analogy, is the ſureſt Method to arrive at the higheſt Knowledge we can have of the Diſeaſe. In highly malignant Fevers, where the Symptoms are abſtruſe, and Cauſes leſs evident, we muſt have Recourſe to the Doctrine of Poiſons to help us on in our Inquiries.

According to the Nature and different Modifications of the Matter of Diſeaſes, it exiſts through a vaſt Number of different Series of Veſſels, in an almoſt infinite Subordination, carrying Blood, primary and comprehenſive of all the reſt, *Serum*, Lymph, nutritious Juice, *&c.* or ſome other highly refined, volatiliſed, æthereal, elaſtic Fluid, contained in circular Canals or Cells. It is not till after a certain Elaboration that theſe Cauſes are perfected, ſo to ſpeak, or produced into Action; and it is in their proper Veſſels that the Fluids acquire a particular morbid Quality. A Gout is not a Rheumatiſm, a Pleuriſy is not a Gout; what would be the Cauſe of a Diſeaſe in the Blood-veſſels cannot reach the Lymphaticks; nor will a Diſeaſe exiſting in this Series of Veſſels have any more than a remote Effect upon the other. While a vitiated Fluid, belonging to an inferior Order of ſmall Veſſels, is involved in the general Maſs, it may be eaſily carried about in the common Courſe of Circulation, without occaſioning any great Diſturbance in the OEconomy: But, ſeparated into its proper Order, it will exert its Power as a morbid Cauſe; which may in ſome meaſure be owing to the Veſſels themſelves being too lax or rigid, more or leſs permeable. And though the Vice of a particular Fluid may, by every repeated Circulation, be in part ſubdued in the larger Veſſels; yet

yet in its own Veſſels it is ſtill aſſuming the morbid Quality; becauſe in theſe it does not ſuffer a due Subaction, as in the larger Veſſels, when immediately under the Force of the Heart and Arteries.

A highly acute effluent Fever, whether ardent or inflammatory, has its Seat in the Blood-veſſels. *Ardency* in Fevers ſuppoſes ſome peculiar Quality of the Blood, as compoſed of red Globules, which may be compared to Fire, or what elſe we pleaſe, affecting the Heart and Arteries immediately, and ſtimulating them into more frequent and forcible Contractions. The ſimpleſt Idea we have of Inflammation, is an Obſtacle in the evaneſcent Arteries; which oppoſes itſelf to, or acts againſt the immediate Impetus of the Heart, and ſo occaſions an equal Reaction of the Heart, or an Increaſe of the ſyſtaltic Motion. Here we have Inſtances of Cauſes acting in a certain Order of Veſſels.

Ardency and *Inflammation* may be both with and without a *Plethora:* For Repletion is not eſſential to theſe, but they are greatly increaſed when this is joined to them. On the other hand, there is equal Danger, when, under *Ardency* and *Inflammation*, there is a Want of Blood; becauſe, the Force of Circulation falling below the Standard, it is with the greateſt Difficulty that we can obtain a Reſolution and Coction. This exhibits to us a Species of *nervous Fever*, where the Cauſe exiſts in the largeſt Order of Veſſels. For, to give a ſhort and ſimple Definition of it, a nervous Diſeaſe is no more than a morbid Cauſe acting in a low State; that is, where, from a Defect of good Blood, there is

not a due Force of Circulation to overcome it.

But, according to the Order of Veſſels in which the Cauſe of the Fever exiſts, the Diſeaſe will be more or leſs acute; that is, the more remote the Cauſe is from the Heart, or the farther it is removed from the immediate Force of Circulation, which is confined to the Blood-veſſels, it becomes leſs active. And as we purſue this morbid Cauſe paſſing into different Series of Veſſels, ſmaller and ſmaller, we inſenſibly loſe the Idea of Acuteneſs; which is always according to the Influence ſuch Cauſe has upon the Heart and Arteries: For it may at length be ſo far removed from the Heart, and become ſo inactive, as to occaſion no more perhaps than ſomething like an *inteſtine oſcillatory* Motion of the ultimate Veſſels and Fibres, but which may indeed in Time affect the very *Modus* of their Coheſion itſelf. This is the true Gradation of a Diſeaſe; in which we have an eaſy View of it, in a regular Progreſſion, from its loweſt chronical Denomination, to the higheſt Degree of Acuteneſs.

The Body being conſidered as a *Congeries* of Veſſels of various Orders, carrying each the Fluid proper to it, deſerves an Inquiry, how, or by what means theſe different Fluids are moved on in their reſpective Canals? Setting aſide the Power of the Heart as the chief Inſtrument of Motion, the Arteries bear a very principal Share in the Movements in the animal *Compages*; not by the internal Motion of the Blood propelled by the Heart, for the Supply of all the ſubordinate Veſſels, but by their external Pulſations. And here we ſhall ſee, by a new, a ſimple, but highly artful Mechaniſm, the Impetus of the Heart

continued

continued upon theſe Veſſels, to which the projectile Force could not extend; for this does not ſeem to be communicated beyond the firſt and great Syſtem of Veſſels.

The Arteries then are diſperſed by innumerable Branches, larger and leſſer, to every Part of the Body, for two great Purpoſes, the Diſtribution of the Fluids, and to impart Motion. So far as we can trace the Arteries carrying red Globules, we obſerve a regular and forcible Pulſation, at leaſt in the larger Trunks and Branches which have their Sides dilated, or in feeling an Artery we think ſo. Even in the ſmall Arteries this Dilatation is plainly obſerved with a Microſcope. But betwixt the various Ramifications, is comprehended an infinite Number of Veſſels of leſſer Orders; which, from their Figure and Texture, ſo far as theſe are known; or from any Power they may be endued with in themſelves, or can receive from the Heart, are not ſuppoſed fit to propel the Fluids in them. When there is a Sufficiency of Blood in the Arteries to keep them fully diſtended, the ſmaller intermediate Veſſels are, by the continual Pulſation externally, compreſſed on all Sides; and it is by this conſtant Preſſure in repeated *Ictus*, that the Fluids in them are moved on. When this is the Caſe, all the natural Secretions and Excretions go on regularly: Which gives us the proper Idea of an healthful State; and which is no other than a continual equable Circulation thro' all the Orders of Veſſels. We muſt form ſome Notion of this from what is done in the Lacteals and Thoracic Duct; which have no proper motive Power in themſelves, but their Contents are

forced on in them by the ſole Action of the circumjacent Parts; or this Power of the Arteries externally excites ſuch a conſtant Action through the whole Body, as may (if I am forgiven the Compariſon) be repreſented by the moſt gentle and alternate ſqueezing and relaxing of the Hand when cloſe ſhut. What is ſaid will, I preſume, be ſufficient to explain the Notion I have of a true mechanical Force, exerted upon every Point, through the whole Subſtance of the Body; wiſely proportioned to the Delicacy of its Frame; and ſo adapted as to anſwer effectually the Purpoſe intended by it, the promoting of the Circulation in the ſmalleſt Veſſels.

But when there is not a Quantity of Blood in the Arteries ſufficient to keep their Sides duly diſtended, little or no Force will be impreſſed upon the intermediate Veſſels, to urge on the Fluids in them. And, 1. There will be a ſlower Motion, or ſome Degree of Stagnation, in the ſeveral Orders of ſmall Veſſels. 2. The Fluids ſtagnating or moving ſlowly, will follow their own Diſpoſitions, and acquire ſome particular Acrimony, too great or too ſmall a Degree of Coheſion, or ſuffer ſome other Change we can only imagine. 3. The Fluids not being quickly enough circulated in the ſmall Veſſels, there will be a ſlower Return of them into the larger; by which theſe will remain in a certain meaſure exhauſted. 4. From an Imminution of the general Quantity, and want of Force to impel the Fluids into them, the very remote Veſſels will be deprived of their Proportion. Hence ſome Degree of a collapſed State. 5. Some of the different Series of ſmall Veſſels will by degrees

ſuffer

ſuffer Diſtenſions, and ſo have their Amplitudes enlarged; which, 6. may at laſt bring on a Redundancy in thoſe Veſſels. Whence, 7. muſt ariſe particular Compreſſions and Stagnations, and farther Interruption to the regular eaſy Tranſmiſſion, and refunding of the ſeveral Fluids through all the Orders of Veſſels. And thus, from a Combination of mutual Cauſes, the original Default continues and increaſes. So far we conceive of a Diſeaſe without a Fever.

But though a ſmaller Degree of a morbid Cauſe in the ſmall Veſſels may not greatly affect the Circulation in the larger; yet, when this Cauſe is much accumulated, and becomes active, then, from the univerſal *Conſenſus*, or that all the Fluids may now partake in ſome Degree of the morbid Cauſe, a general *Stimulus* will be induced; which being communicated to the Heart and Arteries, the Diſeaſe puts on the formal Type of a Fever, in order to ſubdue the offending Cauſe, and reſtore a juſt Balance of Circulation amongſt the ſeveral Orders of Veſſels. This Tranſition from chronical to acute may, according to Cauſes, be either ſudden, or ſlow and more gradual. But we eaſily perceive, that Nature muſt here labour at great Diſadvantage; becauſe there is great Defect of Fluid in the Arteries, or the Cauſe of the Fever acts principally, and is ſeated in ſome diſtant Series of Veſſels. May not then, in a ſtrict Senſe, a nervous Fever be ſometimes called ſymptomatical of a Cauſe acting in ſuch a remote Order of Veſſels? For theſe only are to be accounted genuine Fevers, whoſe Cauſes act chiefly and immediately upon the Heart and Arteries. The

Remiſſneſs of Symptoms is ſuch ſometimes, that we cannot imagine the Blood-veſſels to be otherwiſe than ſecondarily affected.

This Sentiment, rightly purſued and improven, I would call a Key to the right underſtanding of nervous Diſeaſes in general; and may be applied both in acute and chronical Caſes. An Obſtruction to Motion; particular Acrimony or Viſcidity; a Diſtenſion, and ſometimes Redundancy in this or the other Order of ſmall Veſſels; irregular Compreſſions of theſe, and want of Blood in the larger, will account for the various ſpaſmodic Affections, ſudden and uneaſy Senſations, well felt, but not eaſily deſcribed; Failings, Depreſſions, diſorderly Secretions and Excretions, irregular and ſeemingly contradictory Symptoms happening in chronical nervous Diſeaſes, from the loweſt Degree of a vaporiſh Ailment to the higheſt capital Diſtemper. Nor without ſome ſuch Principles ſhall we ever be able to receive clear Apprehenſions of the ſeveral Kinds and Degrees of nervous Fevers, nor of the Symptoms that accompany them. Theſe Fevers, for Conveniency, may be diſtinguiſhed, in the ordinary Way, into nervous, ardent, —— inflammatory, —— rheumatic, —— intermittent, —— lymphatic; beſides what may be called lipothymic Fever, and Fever of the Spirits. I do not ſpeak of nervous Diſeaſes with Repletion; though the Reaſoning may be eaſily adapted to theſe too, and will alſo give us a juſt Notion of an influent ſcorbutic Diſtemper, the fruitful Parent, for moſt part, of every Diſorder of this kind.

This is not a proper Place to enumerate particularly

ticularly all the remote Cauſes that may bring on ſuch a Diſtemperature of the Fluids, or State of the Solids, as may be ſuppoſed capable of producing a nervous Diſeaſe, and explain mechanically how theſe act; nor to condeſcend upon the many occaſional Cauſes that can put the Matter of a Diſeaſe into Action, ſo as to give it an acute Form. Neither do I ſay any thing of that general Laxity, and Tenſion or Irritability, which, in ſome Degree or other, are ever Concomitants of the Diſeaſe. We are too much confined here, I ſay, to enter upon a nice Diſquiſition into theſe Matters.

But a rational, and frequently ſucceſsful Practice is plainly deducible from the foregoing Theory. In chronical Diſeaſes we endeavour to make up the Want of a due *Impetus* from the Heart, upon the ſmaller intermediate Veſſels, by an Increaſe of muſcular Motion; or what is equivalent, in a long and conſtant Courſe of Exerciſe of all kinds, Walking, Riding, Friction, Bathing; by which their ſluggiſh Contents are preſſed on; giving at the ſame time ſuch Medicines as are ſuppoſed to attenuate all Coheſions of the Fluids, in the extreme Veſſels, ſtrengthen their Tone, remove Acrimony, and ſtore the Blood with mild, balſamic, active, invigorating Parts. And, becauſe this Method of muſcular Motion cannot take place in acute Caſes, another and particular kind of Exerciſe, *ad vaſa*, is inſtituted, by bliſtering; which has a certain and powerful Effect upon the whole Frame, and is eaſily underſtood from the Nature of an animal Fibre. We are here likewiſe to give proper Attenuants, together with warming

ing effluent Remedies, to raiſe the Pulſe, and *Antiſpaſmodics*, becauſe of the *Orgaſm* that is inſeparable from Acuteneſs; ſtill remembering, by Plenty of ſuitable Drinks, and a greater Quantity of Food than can be allowed in other Fevers, to keep the large Veſſels conſtantly full, and in an equal Degree of Diſtenſion, that a due Preſſure may be communicated to the ſmall Veſſels. The Goodneſs of the Pulſe in this Fever is determined from the Fulneſs, not the Frequency of it.

This Fever diſappeared with us for ſeveral Years, but of late has again appeared, and with ſuch different Circumſtances, as conſtitutes a new Species of the Diſtemper. It will be beſt underſtood, by enumerating the ſeveral Symptoms that accompany it; which though they do not all concur in one, yet in different Subjects are all to be met with, more or fewer at a Time, in greater or leſſer Degree, according to the Degree of Vehemence and Malignity with which the Diſeaſe is attended.

The Fever runs out to the twentieth, twenty fifth, thirtieth, and ſometimes to the thirty fifth Day. The Symptoms, upon Seizure, are generally ſuch as are common to all Fevers, Coldneſs, Trembling, and frequent Alternations of Heat and Cold, *Nauſea*, Head-ach, and vomiting; while at other times it draws on more inſenſibly. A quick Pain of the Loins or *Coccyx* preſages a Fever of a bad kind; as indeed an acute nervous Pain any where does. In the Beginning there is ſometimes Appearance of Fulneſs and Acuteneſs, ſo as to require bleeding, and the Blood has not the ſizy Cruſt at Top;

at

at other times they are altogether without theſe. The firſt Days they often ſweat profuſely, continually or more periodically; and the Diſeaſe appears in ſome like intermittent, eſpecially if the Urine drops a plentiful lateritious Sediment: But, as the Fever advances, theſe Sweats go off, as well as the Sediment of the Urine; which, now becomes crude, pale, and almoſt taſteleſs, and may continue ſo through the whole Courſe, till a Tendency to Coction, or ſome Accident, ſaturate it, and diſpoſe it again to ſubſide. The different Appearances in the Beginning make no Alteration of the Diſeaſe in the Progreſs. From the ſeventh or eighth Day, ſooner or later, a *Delirium* comes on; which is conſtant, and laſts through the Fever, but for moſt part is not very high: And in many a *Coma* attends. The Tongue is black, chapped and parched. The Sick are faint, highly diſpirited, ſigh heavily, and, when the Fever is vehement, have a nervous or intercepted Breathing, Cough, and Hiccough, and ſometimes feel extreme Coldneſs. The Pulſe is quick, ſmall, weak or flaccid, and at laſt has frequent Intermiſſions. We often meet with Signs of Colliquation; ſuch as, Sweats, with the Extremities cold, and pale Urine, with a fatty Pellicle. A ſymptomatical Looſeneſs, or Deafneſs, or both, accompany it to the End. What deſerves a ſerious Conſideration, is, the frequent Hæmorrhages, or bloody Appearances that happen. I have known them bleed four or five Pounds by the Noſe in a few Hours. Bloody or ſanious Stools, and very fœtid, are obſerved. The Diſeaſe does not continue long after theſe, or the Sick do not long ſurvive them.

Even

Even a bloody Expectoration, if carefully watched, will be often found; or what is hauked up, will be lightly tinged with Blood. This laſt is ſeldom attended with Stitch or Pain, and commonly paſſes unheeded. A *Subſultus* is common, but is not great. Seldom do they die ſoon in the Diſeaſe, tho' it has been fatal before the fourteenth Day; and ſome have died with Convulſion.

The Diſeaſe, before it makes its Attack, gives ſufficient Warning ſometimes. Two or three Weeks before they are laid down, they are low-ſpirited, inappetent, loaded, ſleep ill, ſigh frequently, grone involuntarily, and feel inexpreſſible Diſorder, accompanied with great Fear, Concern and Dejection, and perhaps ſlight Alienations of Mind. Sometimes they have unſufferable Head-ach; which, continuing through the whole Fever, is the only Thing complained of. This *Apparatus* to the Diſeaſe ſhall, if I am allowed, be called the *chronical Stadium*, preceeding immediately the *acute Period*, or that which may be called the formal Seizure.

Before this, perhaps, they have expoſed themſelves indiſcreetly to the Sun, or fatigued in it, ate largely of Fruit, drank bad Wine or Spirits; which brings on a terrible Parchedneſs and Stricture; or they have been long under a Courſe of Anxiety, Care, Fear, Diſcouragement, and other enervating Paſſions, together with Irregularities of Diet, and Manner of Living; which cauſe a bad State of the Juices, as well as a depreſſed State of the Mind. Thoſe, on the contrary, who have not ſuffered from the Habit and Exceſſes of Paſſions, or felt the Severity of Thinking;

ing; who have lived freely, yet regularly, and have been accuſtomed to drink of generous Liquors with Diſcretion, being ſeldom the Subjects of this Diſeaſe.

Theſe are the material Symptoms, and principal Cauſes of the Fever, and ſufficient to diſtinguiſh it from the Species formerly inſiſted on. As there is ſuch a remarkable Difference in the Appearances, there muſt alſo be in the Cauſe: And I beg leave ſtill to make a Conjecture upon it. If the Diſeaſe formerly was ſuppoſed to conſiſt in a *Lentor* chiefly, I think it has now plain Signs of *Acrimony*. *Acrimony* is a Cauſe ſufficient to bring on a Fever of this kind, by giving an univerſal *Stimulus*. The Symptoms may be accounted for from this. And we ought to have every aſſignable Cauſe before us, if we would ſatisfy ourſelves as to the Difference of Diſeaſes, and different Conſtitutions of the ſame Diſeaſe. For Inſtance, a general Conſtriction from this Cauſe will, by forcing the Blood inwards, occaſion Coldneſs of the Extremities, Lowneſs, Fainting, Oppreſſion, and inward Struggle, the ſpecial Characteriſticks of the Fever, which it has in common with the other Species, but in a more remarkable Degree. Nay this *Conſtriction* and *Acrimony* may bring on a particular Stagnation or Obſtruction; which, by their Weight and Eroſion, may cauſe a burſting of the Veſſels: And hence will ariſe Hæmorrhages and bloody Excretions; which may be partly critical, partly ſymptomatical. Has not this particular Symptom, of the Blood being apt to come ſo many ways, ſome Reſemblance with the ſame Appearance in a bad Small-pox?

But

But the Principles and Reaſoning here will ſeem too general. In order to underſtand clearly an Effect, we ought to find it in its proper Cauſe; and, rightly diſcriminating amidſt various Connexions and ſimilar Appearances, endeavour to produce every Cauſe ſimple in its Origin. I ſay then, a general Conſtriction of thoſe Parts that are endued with a greater contractile Power, will neceſſarily throw the Fluids upon theſe that are weakeſt. Parts are ſaid to be *weak* from their Texture and Situation; when they are not ſtrong enough of themſelves to reſiſt, or are not ſufficiently ſtrengthened by the ſurrounding Parts, againſt the Influxes of the Fluids; or when they do not receive a due pulſatory Force from the Arteries, or Action of Muſcles, to promote the Circulation in them. Under this Head are comprehended all the ſmaller Orders of Veſſels, even the Arteries themſelves; which, laying aſide their muſcular Coats, become, perhaps, in their Extremities ſimple Membranes.—Many of the Organs and *Viſcera*, in a ſpecial Manner the Brain, are evidently, both from their Texture and Situation, weak Parts. —And ſuch I would reckon the whole Syſtem of Membranes and Glands:—Which laſt, from the manifold Contortions and Implications of their Veſſels, and ſlow Motion of the Fluids in them, are apt to ſuffer the ſame Accidents as Parts that appear weaker.—The Membranes are largely ſpread out, to give Coverings to all the Parts, to preſerve their Texture, to keep them in their Situation, and facilitate their Motions.—We muſt here conſider particularly the celluloſe Membrane, which is propagated in an inconceivable

ceivable Manner, to the moſt diſtant and intimate Part; and not the ſmalleſt Veſſel, perhaps muſcular Fibre, or Interſtice, but is inveloped or occupied by it (*a*).—The Membranes, whether compacted or cellular, are every where provided with numberleſs Glands for ſeparating certain Liquors;——and the Cells are filled with a rich concreſcible Oil, oily Mucilage, or gelatinous Lymph, for lubricating and nouriſhing the whole Body.—The Membranes are liable to the common Indiſpoſitions of ſolid Parts.—And the Liquors in the Cells may, from a peculiar Taint or Ferment, be heated, fuſed, and rendered acrimonious, and not concreſcible; and ſo become a rancid, eroding, infecting oily Solution, and eaſily abſorbed; or, loſing their mild adheſive Properties, they are turned into a foul, acrid, corrupted, vapid *Latex*.—When the Liquors in the ſmall Cells are much exhauſted, and the Remainder not ſufficient to fill and lubricate them, the Cells collapſe, and the Membrane becomes dry, inflamed, rigid, and leſs pliant.—There is an univerſal Continuity of Membranes, which are ſuppoſed to be Productions of thoſe within the Head, and, in many Caſes, are found to be highly irritable.—Where-ever a morbid Cauſe is ſeated, or acts principally, thither is the greateſt Force of Circulation determined; and the Fluids will be derived in greater Quantity into ſuch Part or Parts, that thus the offending Matter may be concocted and diſlodged.—But, when the general Maſs is diminiſhed, and the Circulation languid, the weaker Parts are not able to urge on their Contents, nor aſſiſted in re

(*a*) See Douglas's Deſcription of the Peritonæum.

turning them to the common Maſs; but, the Fluids accumulating and ſtagnating in them, the Veſſels are overcharged. If theſe Things are granted, the Uſes will be abundantly plain. By this Method of inveſtigating, we are led to diſcover ſome of theſe Cauſes upon which moſt probably the Symptoms depend; ſuch as Stagnation and Hæmorrhage, Tumor and Gangrene, ſudden adipoſe Conſumption, and fatty Appearances in the Urine, partial, wandering, internal Heats, and irregular Coldneſſes, clammy, glutinous, chill Sweats. From an Inflammation of the Membranes, and their Glands obſtructed, or a *Stimulus* infixed, many Affections will ariſe, unobſerved often, and unimagined. Nor will it be difficult hence to conceive ſomething of a membranous Tenſion, or a Stricture of the nervous Parts, when there may, at the ſame time, be a great muſcular Relaxation. This Tenſion communicated to the whole Syſtem, eſpecially the Membranes of the Brain, will produce theſe Appearances from which we infer the Nerves to be affected: And they may be affected from Cauſes placed either in their Origin or Extremities. But to explain how the ſeveral Cauſes act, and Symptoms are produced, would be to enter upon a general Phyſiology. And, becauſe theſe Reaſons and Proofs that may be convincing to me, might to others appear too remote or equivocal, I content myſelf with having only hinted at Things, being always willing, as the Subject eſpecially is purely conjectural, to leave doubtful Opinions upon the Foot of *Inquirenda*.

Profuſe Sweats happening in the Beginning, are

are partly from *Colliquation*, but chiefly from an increaſing *Spaſm*, or the Effect of a general *Niſus* to overcome the Diſeaſe, or from a State of the Blood only tending to Diſſolution; which ſuppoſes ſome kind of Acrimony; and being frequently miſtaken, are encouraged. Inſtead of being critical, or even relieving, they are rather badly *ſymptomatical*, *agoniſtick*, and no way *determining*. The Sick are thus far indeed relieved by them, that, while Nature is ſtrong enough to force them, the Diſeaſe is ſo long kept outwards; and lying conſtantly bathed in Sweat, and warm, the Tenſion is taken off, and they think themſelves happy: But long fatigued with ſuch Sweats, eſpecially when forced, if they ſhould ſuddenly ſtop, and the Patient be very weak, no wonder if he is overwhelmed at once, and die unexpectedly; as has ſometimes been the Caſe. This has deceived many, who argue for the Neceſſity of Sweating, becauſe the Sick may find themſelves eaſy under it, and ſuffer great Diſorder when they have no Sweats; when really they are exhauſted by them, and the Diſeaſe is no way leſſened: For it is not yet aſcertained, that in this Way the Diſeaſe is to be carried off. Not but that Sweating has ſometimes proved ſalutary, at a proper Time, and under certain Circumſtances, though I think this ſeldom happens: But I beg it may not be laid down as the conſtant Method of Nature; and let the particular Genius of the Fever be condeſcended on before it is brought into a Rule. The Fever may be carried off as well by other Methods, Perſpiration, Stool, Urine, diminiſhing the Bulks, altering the Figures of the ſtimulating

Particles, or ſmoothing them, ſo as to render them leſs active, and fit for being excerned. Theſe Things will appear idle to arrant Practitioners; but, if Reaſon and Philoſophy are allowed to enter into Medicine, they are at leaſt ſuppoſable. There is a neceſſary Connexion betwixt Cauſes and Effects. Matter, of what Kind ſoever it be, is ſtill Matter, ſubject to certain and unalterable Laws; and we do not know the many poſſible Changes it is capable of from its Diviſibility, Figure, Attraction, and the Operation of extrinſick Cauſes; which may alter its Texture, leſſen its Coheſion, or otherwiſe abate its Energy.

But, to enter a little into the *Minutiæ* of Things, let us ſee how all this correſponds with a Theory. There is a conſtant *Niſus* and *Reniſus* betwixt the Blood and Blood-veſſels.—A Fluid preſſes *undequaque*;—and the Blood has an additional Force given it by the Impulſe it receives from the Heart, and by which it counteracts the Force of Arteries, that are continually endeavouring to bring their Sides together.—For the Arteries, from their particular Conſtruction, are always in Contact with, ſo as cloſely to embrace the contained Fluid, and thereby reſiſt the too great Expanſion of them. This is a wiſe Contrivance; and the Neceſſity of it is apparent for many Purpoſes of Life.

There is a certain *Equilibrium* here, which is the Standard of Health, and on either Side is a Diſeaſe.—Beſides this natural Contractility of the Veſſels, there is a preternatural Spaſm brought on by the Fever;—and, if the *Moles* of the Blood is diminiſhed, the Capacities of the Veſſels

Veſſels will, from the Contraction thus increaſed, be brought within the Sections of their Diameters, as they are found in a natural State. This Fault of the Veſſels is removed two Ways; by taking off the Stricture, and increaſing the Quantity of the intervening Fluid; or, which is the ſame Thing, cauſing the Fluid to expand, and occupy a larger Space, by which the Capacities will be again inlarged.

Of how much Importance it is that the Arteries have ſtill a Sufficiency of Blood in them to keep their Sides conſtantly diſtended, that there may be always a full dilated Pulſation, has been ſhewn: For it is by means of this that a due Impulſe is made upon the ſeveral ſmaller Orders of Veſſels, to promote the Circulation in them. A general Defect of the Fluids ſeems to be almoſt eſſential to our Fever. The more therefore that is derived from the Blood by profuſe Sweating, or any other increaſed Evacuation, leaves the Veſſels more exhauſted; and there is ſtill a leſs Quantity of Fluids to keep them diſtended, and to reſiſt their Contraction. I know it is ſaid, the Loſs that is ſuſtained by Sweating, is repaired by the copious Supplies of Drink the Sick are allowed. But this will not anſwer the End, if given ſtill with an Intention to promote the Sweating: For then it paſſes off as faſt as it is drank; and does not remain in the Veſſels, ſo as to add to the Quantity. Nor is it eaſy to gain upon the Spring of the Veſſels when contracted within the uſual Capacities; eſpecially when this Contraction is ſo much increaſed by a morbid *Stricture*. I have frequently thought it would be more prudent to moderate, at leaſt,

the Flow of exceſſive Sweating that happens in the Beginning and Progreſs of the Fever. I do not think it will be argued, that Nature, by ſweating, is carrying off the morbid Humours, or any Part of them; for this is not the proper Time. Theſe Sweats, for moſt part, ſtop of themſelves; and though very plentiful, the Sick are diſappointed of the expected Relief. I very often divert them, and without the leaſt Hazard. Whether they ſweat or not, the Fever goes on; and the Diſeaſe is as often malignant and fatal when they have Sweats, as when they do not ſweat: Nay, from them, in many Caſes, I draw a bad Prognoſtick. The Retention of Sweats will only increaſe the Fulneſs; which is a favourable Circumſtance: And, if the Acuteneſs is thereby increaſed, we obtain what is chiefly wanted and intended by almoſt all our Adminiſtrations. If we ſay that theſe ſpontaneous Sweats are any way critical, (and ſuch they muſt be, if they are in any Degree relieving), and therefore to be encouraged; beſides that there is no certain Proof of this, it does not coincide with the ordinary Notions of Coction. I believe there are Methods by which Coction may be haſtened: But, when the Thing is committed to Nature, it is not performed but in a determinate Time: For in moſt Fevers there is a fixed ακμὴ, when the Matter is fully concocted; and not till then is it ever ſuppoſed fit to be carried off. The Sweats that happen in this Fever are the Effect of Nature. Can we then imagine ſuch Sweatings to be any ways critical in the Beginning, when the Fever of itſelf, nay, after all the Aſſiſtance of Art, ſhall not come to the Decline

cline in leſs than Weeks? To pronounce with Judgment in this Point, we muſt carefully attend to Practice, and the Senſe of Authors of greateſt Note, who do not ſeem to lay ſuch a Streſs upon Sweating as is commonly done *(b)*.

While I am writing this, (*Nov.* 1741), I meet with ſome Inſtances of a Fever like that formerly inſiſted on. It comes to an End about the 14th Day; and ſeems to proceed from mixed Cauſes, having Signs both of Inflammation and Acrimony; attacks inſenſibly ſometimes, and is highly malignant. As the Diſeaſe advances, the Sick are conſtantly almoſt under a *Coma* or Raving; and they die of an abſolute Oppreſſion of the Brain. About the 7th Day, profuſe Sweatings come on, followed by a manifeſt Aggravation of all the Symptoms. Upon this Account I have juſt mentioned it. And, upon the whole, after the moſt diligent Obſervation, I am ready to conclude, there is no Relief, no Security, by a Method of Sweating, in nervous Fevers.

There is nothing we are ſo uncertain of as a *Criſis*. And it is of great Importance, (beacuſe of the certain good or bad Influence the knowing or not knowing of it has upon Practice), to be well acquainted with the Methods of Nature in carrying off a Diſeaſe, as well as how it is brought on; to know whither the Diſeaſe finiſhes itſelf by a formal, effluent, material *Criſis*, or ſtated Expulſion of the offending Cauſe, or in ſome other leſs evident, but equally certain, and perhaps explicable Way. When a *Lentor* has cauſed the Fever, this *Lentor* continuing ſuch, is too groſs to paſs any of the common Outlets; but, by repeated

(b) Freind Comment 3.

repeated Circulations, and due Motion and *Momentum* of the Fluids, may be ſufficiently attenuated. When the Humours are brought to a right Degree of Tenuity, they are again rendered fit for Circulation; they become all ſound; no Cauſe of a Fever exiſts; there is no offending Matter to be expelled; and the Reaſſimilation of the diſeaſed Fluids is the Solution of the Diſtemper. This Kind of *Criſis*, which, for the ſake of a Name, may be called *aſſimilatory*, to diſtinguiſh it from that which is properly *depuratory* or *expulſive*, will be very ſurpriſing to thoſe who wait for ſome more evident Signs of Termination, and want to have their Senſes ſatisfied by ſome notable Excretion; the vain Expectation of which, has probably diſpoſed them to treat the Diſeaſe in a Way quite repugnant to Nature. When the Fever is brought on by an *Acrimony*, intimately mixing with, or adhering to the Blood, or ſeated in ſome remote Order of Veſſels, the Caſe becomes more obſcure and difficult; an acrimonious Cauſe in all Diſeaſes being the moſt obſtinate. The Matter is here very ſubtile, perhaps ſeated in the remote Veſſels; and, in a weak exhauſted State, where the *vis vitæ* is remarkably deficient, cannot be diſengaged and accumulated, ſo as, in a determinate Time, to be carried off, in a ſenſible, regular, material *Criſis*. In this Caſe we muſt wait Nature in the Courſe of a tedious Proceſs; which, before the Matter of the Diſeaſe can be, by gradual and inſenſible Methods, thrown out of the Body, or rendered bland by a Change of Texture, induced by repeated Circulations, may be lengthened out to ſome Weeks, without any ſenſible and

ſalutary

ſalutary Excretion, Remiſſion of Symptoms, or Change of its Shape. This, if rightly underſtood, not only gives a Reaſon for the uncertain, and ſometimes ſurpriſing lengthening out of Fevers, from this Cauſe; but greatly invalidates the Doctrine of *Criſes*, and critical Days, as known to, and inſiſted on by the Antients. When we meet with a thorough *Criſis*, that wholly and at once rids the Body of the Diſeaſe, we muſt ſuppoſe a Matter betwixt groſs and ſubtile, and perhaps mixed, as to Qualities; and ſtill an increaſed Force in the Circulation, to bring it to Coction, as well as to expel it. The ſhorter the Fever, the ſurer we are of a ſenſible *Criſis*.

I do not know whither I ſhall be reckoned perfectly right, and the Parallel juſt, when I compare a Fever, iſſuing in a ſtated, compleat and ſalutary *Criſis*, to a Tumor that ends in a benign Suppuration; an Event that is always ſpeedy. A Fever, again, without a ſenſible *Criſis*, in ſome ſort, I think, reſembles thoſe Tumors that terminate by Reſolution, or in a languid Apoſtemation; either of which, in many Caſes, it is very hard to obtain. A Portion of Matter indiſpoſed for Circulation, and the Purpoſes of Health, confined to, and acting in a determinate Number of Veſſels of any Order, may form ſome external Ailment, a Diſeaſe of the Part. This ſame Matter, diffuſed, increaſed in Quantity, or otherwiſe modified, may be made to occupy an entire Series of Veſſels, or more, through the whole Body; and ſo will create an inward Diſtemper, affecting the Habit. A retroceding external Ill often excites a formidable Fever; a

Fever

Fever as often has the Matter of it diſcharged upon the external Parts: In both Caſes, the Diſeaſe is under the ſame general, ſimple, uniform Laws; and, according to the Remoteneſs or Proximity of the Cauſes, with reſpect to the Heart, or Force of Circulation, according to the Agency, Attraction, or other ſuppoſed Conditions or Properties of Matter, ſo will the *Coction* and *Termination* be, quicker or ſlower, more or leſs favourable. I do not affirm any thing. But this may be obſerved, that there is an exact Conformity betwixt Diſeaſes external and internal; and one gives the Clew, and is the genuine Index to the other. We can only reaſon conſequentially from Things cognoſcible by our Senſes, to thoſe that muſt be judged of by their Effects; and it ſeems to be the direct Way to attain to the real and immediate Knowledge of a Diſeaſe, and to find out the true Intentions of a Remedy, the Fitneſs of it, the Time and Manner of Application, and the *modus operandi*. Upon this Plan, a great deal might be done, very profitable both in Science and Practice. I have juſt offered to ſhew how it is applicable to the preſent Subject. As agreeable therefore to this Reaſoning, I ſhall venture to define a Fever, with reſpect to the Cauſes of it, to be ſuch a State of the Fluids in this or the other Order of Veſſels, as is obſerved or ſuppoſed in particular Tumors; that is, a Tendency more or leſs to Stagnation and Putrefaction.

In our Fever formerly, I for moſt part obſerved a Looſeneſs to accompany the Diſeaſe about its Height; and was willing to think that it was a Motion of Nature to expel the now concocted Matter

Matter of the Diſeaſe. It was generally a good Sign about the fourteenth Day. And I can be confident in it, that no other Excretion was ever relieving, happening at or before the Height, whatever it was after it. I ſhall not deny, that this Looſeneſs might have been ſometimes a real and material *Criſis*; yet I cannot think, but that it was rather an Effect of the Diſeaſe being ceaſed; which I place in a Reaſſimilation of the Matter, and conſequently a Solution of the general *Spaſm*; not the offending Matter or Cauſe of the Diſeaſe thus carried off. When the Matter of the Fever is concocted and aſſimilated, Nature, before under an univerſal *Stricture*, ſuffers now an eaſy Relaxation; and the Fluids, from being ſtrongly compreſſed, have room to expand, and occupy a greater Space. The Veſſels thus dilated, the Fluids ruſh, *quâ datâ portâ*, upon this or the other Part, ſo as to occaſion Looſeneſs or moderate Sweats. Theſe may be encouraged with Safety and Relief; becauſe it brings Things again into their natural Channels, and carries off ſuch Recrements as may have been retained during the Courſe of the Fever.

A true practical Theory, founded upon Reaſonings of this Kind, having Nature ſtill for a Rule and Guide, as it gives infinite Pleaſure, ſo it will be of the greateſt Uſe; whatever may be objected to it by thoſe who, from being long accuſtomed to mere Practice and Obſervation, and having ſeen the Falſity and Inſufficiency of general Theories, are, through Careleſſneſs or Affectation, fallen into a habitual Contempt and Neglect of all Theory. And, to reduce this to Practice, one Inſtance will be ſufficient to ſhew the

the Truth of it. If from a ſlight Obſervation, and pre-conceived Notion, that ſome fixed unalterable Matter is the Cauſe of a Fever, and that this Matter is not to be overcome but by Nature exerting all her Force to expel it, which, by any Change it may undergo, they do not imagine can be retained, but muſt be diſcharged in ſome ſenſible and plentiful Evacuation for the Preſervation of the Individual. This formal Reaſoning may appear plauſible to ſome, only the leſs thinking I hope: But if from ſuch Reaſoning they ſhall proceed at random in all Caſes, without conſidering the Method of Nature in a Diſeaſe, by warm, forcing, irritating Methods, to ſweat the Patient into Health, and urge her on to effect what in the Courſe of the Diſeaſe was never intended, and juſtify their ſo doing from ſome ſpecial Inſtance or Authority; this would be really to preſume upon the moſt ſlender Evidence, and, from ſlight and particular Premiſſes, to draw certain and univerſal Conſequences, and eſtabliſh a Rule, which might be extremely hurtful in Practice. One Teſtimony is ſo poſitive upon this Head, that it cannot be overlooked: *Tam itaque in hoc quam in aliis morbis quibuſcunque quos mihi videre contigit, demptâ ſolâ peſte, ſudores prolicere non tam medici quam naturæ provincia eſt* (c).

I have ſaid, that a *Delirium* continues here much longer without ſo much Danger as formerly: For if it continued above four Days obſtinate, without ſome Signs of Remiſſion, the Caſe was mortal. We ſhall not be able to account for theſe different Appearances, unleſs we acknowledge

(c) Sydenham. Tract. de podagra, p. 417.

ledge ſome Difference in the Cauſes. In long tedious Fevers, a *Delirium* will be upon the Patient for many Days, who ſhall notwithſtanding do well. A *Delirium* proceeds from Obſtruction, a Spaſm, or a Defect of Circulation. That the Membranes of the Brain may be affected with a Spaſm, ſo as to compreſs the Subſtance of it, and bring on a *Delirium*, we need not doubt, when we obſerve what happens in maniac Caſes, where the Patient ſhall be delirious for Weeks or Months, and without any evident Cauſe recover of a ſudden. From a ſudden and violent Paſſion I have known Deafneſs, Blindneſs, and Loſs of Speech, brought on by turns, and ſometimes Inſenſibility for ſome Days, ſo that an Apoplexy ſeemed unavoidable. This muſt have been altogether from a Spaſm, affecting ſometimes one Senſe, ſometimes another. In many Diſeaſes, a *Delirium* is brought on when the Cauſe is very remote from the Brain; which in this Caſe muſt be only ſpaſmodically affected, by mere Conſent, not from any morbid Cauſe exiſting in it. In a feveriſh *Delirium*, this Spaſm may ariſe from an acrimonious State of the Juices, affecting the Brain either immediately or remotely: And we can eaſily imagine how Nature may labour under it a long time, becauſe we ſuppoſe the Fluids not diſpoſed of themſelves to Obſtruction, or to form any mortal *Staſes*; and the *Acrimony* that occaſions the Fever, *Spaſm*, and *Delirium*, may in Time be rendered inactive, or waſhed out by plentiful Dilution and continued Drains.

But when a *Delirium* is cauſed by an obſtructing Matter, this Cauſe is ſeated in the Veſſels

of the Brain itſelf, as well as its Membranes; and is ſtill more fixed by the general Spaſm, and conſtantly increaſed from a ſizy Blood, till all the Parts within the Brain are overcharged, that they cannot perform their Office: Upon which all the Functions muſt ceaſe, and Life at length is deſtroyed.

A ſlow Circulation in the Brain, or ſimply a Tendency to Stagnation, from an effete State of the Fluids, or a Defect of them, has no ſmall Influence likewiſe to bring on a *Delirium*; when the ſeveral Motions and Secretions in the Brain (upon which all the Senſes, both external and internal, depend) are not, for Want of a ſufficient *Impetus*, rightly performed, with Conſtancy, Freedom, and Regularity; or the Fluids ſtagnating, become a Load upon theſe delicate Organs of Senſation, by which their Action is hindered or perverted; in conſequence of which the Faculties muſt neceſſarily ſuffer. This we ſhall find to be often the Caſe in nervous Fevers.—— Theſe Diſtinctions (and ſome ſuch were held, by ſome of the Antients, *(a)* in the Notions they had of a Frenzy) duly adverted to, give Light into the Subject; and we are made to underſtand in a rational Way what a *Delirium* is, in its Nature, Cauſes, Duration, Periods, and various Appearances; eſpecially if, to complete the Idea of it in all its Circumſtances, we conſider attentively, in viewing theſe Cauſes, the Manner of their acting, and whether they exiſt ſingly or combined. Would it not be ſtill farther of uſe to conſider Drunkenneſs in its Cauſes and Effects, and what Relation

(*a*) Cæl. Aurel. præf. lib. 1. morb. acut.

tion it has to this kind of Fever, and the Symptom now treated of?

Upon the ſame Principles let us endeavour to carry our Reſearches as far as we can with Reaſon and Probability, that we may be able to underſtand the Diſeaſe thoroughly. From the general Cauſes of a *Delirium*, and their Effects upon the Brain, various Diſorders will happen, not very obvious ſometimes, but eaſily ſuppoſable, and that have the greateſt Influence upon Life. A *Lentor* obſtructing, or Spaſm compreſſing the Brain, muſt interrupt the free and equable Circulation in the Veſſels: And hence will ariſe ſlight Tumor of ſome particular Part or Parts, and Inflammation; which will more readily happen, if the Humors from Acrimony are apt to cauſe Eroſion: Or this Obſtruction and Compreſſion may occaſion a Stagnation of Serum and Lymph in their Veſſels; which, after ſome time, theſe Veſſels being ſtretched and overcharged, will not be eaſily put again into Motion. And if this Cauſe increaſes, an Extravaſation may follow. To ſome ſuch local Affections as theſe, are owing the Deſtruction of ſome Parts as to their Uſe; unaccountable Languiſhing after the Fever ſeems to be terminated; and Returns of Fever in Paroxyſms, or a more continued Form, when the original Cauſes of the Fever and *Delirium*, we have Reaſon to think, are in a good meaſure ſubdued. I would not imagine Things of this kind, without being ſupported by Practice; having ſometimes, in the Courſe of the Diſeaſe, met with remote Signs of a Palſy; ſuch as Weakneſs and watering of an Eye, with ſlight Inflammation, and imperfect

Viſion of it, beſides being ſenſibly retracted; the bliſtered Parts of that Side not looking ſo florid, nor diſcharging ſo well as the other. If from ſuch Inflammation, or ſtagnating of the Humor, a Suppuration or Tendency to gangrene follows, the Patient, before reſtleſs, begins to have a ſleepy Oppreſſion upon him; he has ſtill ſomething of *Delirium*, but is for moſt part pretty ſenſible. There may be an Increaſe of Fever irregularly. The Urine changes, being by turns pale and highly ſaturated, and ſometimes black almoſt. We are ſtrengthened in this Opinion, if, under theſe Appearances, the original Fever is ceaſed; which we judge of by the Time and other Circumſtances. And it is not an abſcure Sign of the Parts being much leſed, or Humors extravaſated, if Convulſions happen. I do not ſay, I was always right in this Diagnoſtic of an Abſceſs and Gangrene; but it gives an Opportunity to recommend a frequent anatomical Inſpection of thoſe who die of Fevers, to aſcertain the Truth of Facts, and enable us to judge when the Diſeaſe is ſimple, when complicated. When the Symptoms of the Fever are overbearing, theſe engage all our Attention; and the Appearances of a local Affection of the Brain not being ſuſpected, paſs altogether unobſerved. As in ſome Inſtances we are almoſt ſure of the Thing, methinks we ſhould in all Caſes have a regard to it, leſt an Effect of the Fever become itſelf the Diſeaſe, and be the Cauſe of Death. Many would have eſcaped a very bad Fever who could not overcome that which is only an Accident of it.

But there are other Conſequences of the Fever,

ver, which though not mortal, yet from a *Labes* impreſſed upon the Brain, they lay a Foundation for many after Ills, equally troubleſome and hard to remove. If the Veſſels, from a long Stagnation of the Fluids in them, or an increaſed *Impetus* upon ſome of them, are overcharged, and the Membranes are ſtrained by a continued Spaſm, theſe Parts muſt be much weakened, and will be liable upon every Accident to Influxes and Diſtenſions. A Stagnation of Humors, and Inflammation, may occaſion a thickening of the Coats of the Veſſels and Membranes, and a ſchirrous Diſpoſition of them muſt enſue. If, from great Inanition, the Veſſels ſhould be much exhauſted, ſome of them may collapſe, perhaps irrecoverably. But this is a ſingular Affection, and requires a ſingular Method of Cure.

It is eaſy to imagine a Number of Ailments proceeding from ſuch Indiſpoſitions of the Brain and its Membranes. Hence will ariſe different kinds of Head-ach, Giddineſs, Confuſion, Failings, and a long Train of nervous vapouriſh Diſorders, depending upon Cauſes within the Head; which very often are not to be removed, till in a Courſe of Years, the Tone of the Parts, and equable Circulation through all the Veſſels, is fully reſtored. When theſe Cauſes are great, they may impair the Faculties, and ſometimes end in Fatuity. Theſe conſequential Ails are common to all Fevers; but happen moſt frequently in this. It was fit to take notice of them, becauſe, Life and Health being ſo much affected by them, we ſhould be always aware of them, and underſtand in what Manner they are

cauſed. In this indeed I do not deſire to impoſe my Opinion; for I know every one will reaſon and judge according to his own Apprehenſion of Things.

To prevent therefore, and remove theſe Effects of the Fever, or rather to remedy thoſe Indiſpoſitions of the Fluids that are originally the Cauſes of the Fever, and upon which conſequently theſe Effects depend, ſeems to be a very neceſſary Intention of Cure. In this View it is propoſed, that, to all our warming, attenuating, ſtimulating, or antiſpaſmodic Remedies, *Cinnabar* be added, and in no ſmall Quantity. This is not incompatible with the Diſeaſe, nor with any Indication we form to ourſelves in the Cure of it. In a genuine, exquiſite, topical Inflammation, *Mercury*, as a Purge and Attenuant, is beyond every thing. In univerſal Inflammation, there is not, perhaps, after bleeding, a more powerful Antiphlogiſtic than *Cinnabar*, *Camphire*, and *Nitre*. *Cinnabar* is in great Credit with ſome in ſerous and lymphatic Stagnations, not yet *extra vaſa*. In all Diſeaſes from an acrimonious Taint, or undue Coheſion, we have Recourſe to ſome Preparation of Mercury as the laſt Reſort, to ſweeten the Humors, or de-obſtruct, and bring them again to a ſound State. But moſt of the Medicines found uſeful in nervous and vapouriſh Ailments, are preſcribed familiarly in our Fever; which is a ſtrong Argument for their being the ſame. And if a mild Preparation from Mercury is, upon parallel Indications perhaps, freely uſed in theſe, I cannot ſee a good Reaſon why it may not be uſed in this too.

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There is an Objection here that ſhall be allowed to have its Weight in part. Theſe Medicines that can be boldly preſcribed in chronical Caſes, are adviſed with the greateſt Caution in acute, becauſe of their Activity; which, joined to the Acuteneſs of the Diſeaſe, might bring the Patient into greater Danger. To obviate this, beſides what is ſaid of the Uſefulneſs and Inoffenſiveneſs of this Medicine, even in acute Caſes, we ſhould be well informed what Acuteneſs is. Acuteneſs in Fevers, which is only an increaſed Motion of the Blood through the Heart and Arteries, from a particular Cauſe, depends, I ſay, upon the Velocity and *Momentum* of the Blood. The Velocity is according to the Quantity propelled in a given Time through the Heart and Arteries; the *Momentum* is according to the Quantity and Velocity: All which are meaſured by the Strength and Quickneſs of the Pulſe. But, in our Fever, though the Velocity is increaſed, the *Momentum* is not increaſed in Proportion; becauſe the Quantity is not increaſed, but *è contra* for moſt part: And therefore the Pulſe is not ſo ſtrong, nor frequent, as in ſome other Fevers; by which the Degree of Acuteneſs is greatly diminiſhed; and, in the Choice of Remedies, we are left more at liberty. Hence likewiſe we draw a Reaſon for a leſs exquiſite Method of Diet.

And here it may not be amiſs to take another View of a Fever, as it ſubſiſts in a highly exhauſted State, where the Acuteneſs is not to be determined from the Strength or Frequency of the Pulſe. When, from old Age, bad Habit, and languiſhing before, or great Fatigue, and ſtarving,

ſtarving, in the Beginning of the Diſeaſe, and unneceſſary Evacuations, Nature is greatly ſunk, the Pulſe is felt even below the Standard in Health; a Fever in this Caſe is attended with uncommon and threatening Symptoms from Lowneſs. The higheſt Cordial and Strengthener, the *Cortex*, muſt be given upon the ſmalleſt Appearances of Remiſſion, to fetch up from under this ſtrong Depreſſion, leſt the Patient languiſh into inſuperable *Deliquia*, from the Circulation being ſuſpended in the Brain, through a general Defect of the Fluids, and great *Inertia* of the Solids. In ſuch a Caſe I have oftener than once allowed the Patient a Bottle of ſtrong Wine every Day, in one Shape and another, moſtly by itſelf, beſides having proper Food continually poured into him; without which it would have been impoſſible to ſupport him.

The mighty Efficacy of the *Cortex* in the Decline of long nervous Fevers, or after a Remiſſion, is well known to thoſe who have been wiſe enough, by cautious and repeated Trials, to aſſure themſelves of its Uſes and Succeſs, and are thereby become expert in the Uſe of it; they know how much it is to be truſted to, in what Caſes it can be given with Safety, and the Time in which to exhibit it. To ſubdue the Fever, and prevent the Returns of it, when a few more *Acceſſes* would wear Nature out; to raiſe Nature when the Diſeaſe is much over, and the Patient ready to die of mere Weakneſs; to prevent and remove many Conſequences of the Fever, that, without ſuch Relief, might become fatal, ſuch as Stagnations, partial Inflammation, and Tendency to Gangrene:

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to anſwer theſe and the like Purpoſes nothing can equal the admirable Virtues of the *Cortex*; which, if we believe thoſe who have had the largeſt Experience of it, is, under proper Circumſtances, a certain Antidote of all Fevers, where the Veſſels are ſtill entire, where there is no Extravaſation, and *Pus* is not already formed.

Formerly I affirmed, contrary to common Practice, that bliſtering in the ordinary Time and Way did harm, or had very little good Effect. I was confirmed in this by the Authority of ſome juſtly reckoned amongſt the firſt in Reputation and Practice, who aſſured me, that at that Time they could not obſerve the uſual and deſired Succeſs from bliſtering the more ſenſible Parts. Now I think it has very ſenſibly a better Effect, and ſeldom does harm: There does not ſeem to be ſuch a remarkable Tenſion; and conſequently there is leſs Diſpoſition to be irritated. This with me is an Argument, that *Acrimony* is chiefly to be accounted the Cauſe of the Diſeaſe; becauſe a *Lentor* in the Blood is more difficultly circulated, and the Arteries muſt exert a ſtronger *Niſus* to make it paſs the extreme Veſſels. Hence ariſes a general highly increaſed *Spaſm*. There is as little Ground to think, that bliſtering ſhould take place in all Caſes of the Fever, at all Times, and in the ſame Manner, as to believe that there is in Medicine a true *Catholicon*; and they muſt give but ſmall Attention, who have not ſeen that what is uſeful in Fevers at one Time, may be hurtful at another. It is Practice only can inform us of this. What was meant in a more general Senſe, may with ſmall Reſtriction be applied

plied to Fevers in particular: *Sæpe vero etiam nova incidere genera morborum, in quibus nihil adhuc uſus oſtenderit, ut ideo neceſſarium ſit animadvertere unde ea cæperint, ſeu ſine quo nemo mortalium reperire poſſit, cur hoc, quam illo potius, utatur* (*b*). That there ſhould be an Alteration in Practice according to the Change of a Diſeaſe, in the different Conſtitutions of it, will be inſiſted on by all who are acquainted with the Hiſtory of Diſeaſes; who know that theſe are not the ſame identically now they were ſome Years ago, or may be but a Seaſon hence; who have obſerved the great Difference there is in Diſeaſes at different Times, both in their Genius and Appearances from the ſmalleſt ſpecific Difference of the Cauſe: and who are not, in ſhort, irretrievably loſt in a *Routine* Practice.

But though bliſtering the Back and Limbs appears to have of late a better Effect, this does not at all ſuperſede the Neceſſity of bliſtering the Head; which to me ſeems ſtill the moſt preferable, where-ever the Head is much affected, and the Diſeaſe approaches to Malignity. A *Stimulus* applied ſo near the Origin of the Nerves, will procure a great Degree of animal Life or organical Force. This *Stimulus* will likewiſe confirm the Tone of the Veſſels and Membranes of the Brain, ſo as to prevent their undue Oſcillations and ſpaſtic Motions, and ſecure them againſt Stagnations. This Effect it will have in the Beginning, to prevent, as much as poſſible, a *Delirium*; and may be repeated from time to time to remove it. But the Succeſs

(*b*) Celſus in præf.

ceſs of bliſtering will, in a great meaſure, depend upon the Quantity of the active Salts of the *Cantharides* ſent into the Blood; and this, again, will be in proportion to the Largeneſs of the Surface to which a Bliſter is applied. There is no equal Surface of any Part of the Body that can be bliſtered with ſo much Eaſe and Safety as the Head. The volatile active Parts of the *Cantharides* being ſent plentifully into the Blood, will looſen and break down the acrimonious Coheſions, ſcour and ſtimulate the Glands and ſmall Veſſels to a Diſcharge of their foul, heated, ſtagnating Contents, and diſpoſe the whole Body to a freer Perſpiration, by opening the ſeveral Excretories, and preparing the Humors to be excerned; and this in oppoſition to all forced, profuſe, and untimely Sweatings, which generally are inconſiſtent with the Genius of the Diſtemper, and not the Method of Nature in it. In the Species of nervous malignant Fever here deſcribed, I have had as much Pleaſure in obſerving the kindly Effects and happy Succeſs of bliſtering, as, in that formerly treated of, I was frightened and diſcouraged by the bad Effects of it.

It ſhews ſtill the different Genius of the Fever at this Time, that vomiting was uſeful. Not that I ever almoſt could diſcover Signs of any Indiſpoſition of the firſt Paſſages, where ſome preſume the Cauſe of the Fever to exiſt, and ſo to require this Aſſiſtance. I always conſidered Nature as in a languid State; the ſeveral Powers impaired from a general Defect of the Fluids; whence a Defect of the circulatory Motion, Diſpoſition to Stagnation, and further Corru-

Corruption of the Juices. A Vomit given the ſixth or ſeventh Day, when the Head began to be affected with Sleepineſs or Raving, had this good Conſequence, to ſtave off theſe Affections for ſome Days, or keep them moderate; rouze the Patient into greater Life; and render the Fever through the whole milder. Given ſooner, the Effect would have been over before the Time it was chiefly wanted; later, the Diſeaſe was perhaps too far advanced to have exhibited it with Safety.

In this Species of the Diſeaſe, the low, depreſſing, nervous Symptoms are ſtronger, and the higher Methods of ſtimulating are more neceſſary, and eaſily borne. In Raving with a low, intermitting Pulſe, *Subſultus*, Fainting, and Coldneſs of the Extremities, beſide frequent Bliſtering, we muſt give *Camphire* and *Caſtor*, which are effluent and antiſpaſmodic; and, if the Urine is ſcarce, *Sal ſuccini*. Small Dozes given frequently anſwer beſt, and the Effect is conſtant. This Method I ſhould have ſaid has hitherto pleaſed me beſt, not having had Courage enough to give greater; though I know the Antients gave *Caſtor* to two Drachms a Doſe in Fevers. *Galen*, *Aretæus*, *Dioſcorides*, *Pliny*, *Trallian*, *Ægineta*, all ſpeak ſomething of it. Medicine, I believe, has ſuffered no ſmall Loſs through our Ignorance of ſeveral Specifics (ſo called, but which a better Philoſophy pretends now to explain) of the Antients, both as to their Uſe, and the Manner of applying them; being now altogether neglected or underdoſed. The Uſes of *Serpentaria*, *Valerian*, *Aſſa fœtida*, *Myrrh*, terreous Abſorbents, are, I ſuppoſe, well enough

enough known; and the Forms and Manner in which they may be given. Juleps, or Drinks contrived upon the Model of the Antients, to be taken in Draughts, are wonderfully refreſhing and ſtrengthening to the Sick; for to deal in Spoonfuls, is trifling.

Acrid Cataplaſms are of uſe here, which they were not formerly; but muſt be applied with this Caution, that they are to be kept no longer at the Feet than they begin to ſtimulate, and give a right Degree of Heat. When taking them off, lenient Poultices of Bread and milk and Vinegar are to be applied, eſpecially during the *Exacerbation*, to allay the Heat and Struggle, renewing them alternately, and ſo keeping up a conſtant gentle Heat and *Stimulus*, without increaſing them to Irritation, beyond what the Neceſſities of Nature may require. What the juſt Degree here is, few give themſelves the Trouble to think; though nothing is more certain, than that Means ought always to be proportioned to the End. But it is not eaſy to judge how far we may go to aſſiſt, without being ſaid to force Nature. If, after Applications of this Kind, the Pulſe becomes full and ſtrong, and is not much accelerated; they promiſe to anſwer the End propoſed by them; becauſe we thereby judge, that there is yet no great Defect of a Fluid in the Veſſels, and that theſe are not much affected by a Spaſm: But, if the Pulſe becomes quick, hard, and more contracted, accompanied with ſmart Heat, Toſſing and Anxiety, we are to expect no Good from ſuch a *Stimulus*.

Diluting Liquors, demulcent and eaſily nou-

riſhing, are to be given plentifully. Theſe are Almond-emulſion, or fine clear Water-gruel, with a ſmall Proportion of Cream, Decoction of Bread and Currants, with a little Mace, ſmall Sack-whey, and Chicken-broth, Sage-tea likewiſe; and to theſe may be added both Juice and Rhind of bitter Oranges, to take off the Inſipidneſs of ſuch Drinks, or any other Thing to render them more ſprightly and refreſhing, ſuch as Wine, or ſome cordial Water. Would not ſmall Punch be ſometimes a good Drink? when the Longing was great, I never refuſed pure Water, cold or with a Toaſt, or altered to the Taſte, and for the Stomach's Sake, with Syrup of Oranges, or Gelly, or Marmalade, and a little Wine. In a febrile Languor, Æſtus and Struggle, nothing is ſo much deſired, nothing gives ſuch exquiſite Pleaſure in Drinking as Water. Freſh from the Spring it is endued with a peculiar Spirit, which, joined to its Coldneſs, renders it beyond every thing reliſhing and refreſhing. The conſtant Uſe of it among the lower Kinds of People, ſhews at leaſt that it is not hurtful, when not too much indulged. It is every Day given in Faintings, Hyſteric, and other ſlow Ailments, with the ſureſt Relief. And the Virtues of it, in Fevers particularly, are largely inſiſted on by a great Variety of the beſt Authors. At the ſame time that Drinks are always to be ſuited to the Degree of Heat, Thirſt, and Vehemence of the Fever; they ſhould, in general, be of kinds leſs diſſipable, that, remaining a longer Time in the Veſſels, they may keep up the Fulneſs of them; and, mixing intimately with the Acrimony, more

effectually

effectually retain it, that it may be ſoftened, or carried off in the common Excretions.

In a former Eſſay, I endeavoured, from Reaſon and Experience, to juſtify and recommend the Practice of giving Wine in Fevers, and attempted to explain the Operation of it, and ſhew its Uſe in the then prevailing Kind, from the moſt natural and obvious Principle. I alledged, that by a congenial Heat, or cheriſhing Warmth, friendly to Nature, it kindly relaxed the tenſe Fibres and Veſſels, taking off the febrile Stricture, which at that Time ſeemed to be a conjunct Cauſe, or chief Symptom of the Fever, and eſſential to it. I ſhould then have added, that this Heat was equally effectual to ſubdue a *Lentor*, and ſo remove all ſlimy, mucous, ſizy Indiſpoſition of the Fluids, where there is not already too much preternatural Heat, or Tendency to Inflammation. This Attenuation of a Viſcid in the Blood, by a proper Heat excited in the Veſſels, ſeems to be analogous to what paſſes in Incubation; where, by a moderate, well-proportioned, adventitious Heat, and the gentle Action of the aerial Sac, the *albumen ovi*, which is a tough gellied Liquor, is beat down into a perfect *Liquamen*, fit to be imbibed by the delicate Veſſels of the Yolk or *Placenta*, ſo as to become a proper Nouriſhment for the tender Chick: Or it may be more groſsly repreſented by diſſolving a Gelly with a culinary Heat.

I mentioned likewiſe theſe Virtues of Wine that render it uſeful in this other Species of the Fever, in which the Blood is ſuppoſed poor and inactive, filled with Acrimony, or too much

colliquated. Here it deſerves truly the Character of a high natural Cordial and *Alexipharmic*, and muſt be placed firſt in the Rank of ſafe and effectual Remedies, as certain and agreeable in its Operation; as moſt other Things are loathed by the Patient, and precarious.

It were to be wiſhed, amongſt many other Things, that this Practice of giving Wine in Fevers, could be revived and improved from the Antients. From many Paſſages of various Authors, we are ſure they had it in uſe. They have indeed, with much Caution, circumſcribed the Uſe of it, being very particular as to the Kind, Quantity, and Quality, of the Wine; the Diſeaſe, the Times, and other Circumſtances of it, in which Wine was to be given: All which makes me think that this Fever was not known to them; for had it been a Diſeaſe of that Day, their Courage and Experience would ſoon have ſuggeſted a more liberal and unreſtrained Uſe of ſuch an apt Remedy, which is altogether ſuited to the Genius of it, and may be given ſometimes in great Quantity, and under the worſt Symptoms.

Nor have the Moderns failed in recommending it. It would be endleſs to reckon up all they have ſaid of it; ſome out of fond Prejudice; others indeed with better Reaſon; very few perhaps from a ſolid Trial of it. This, in general, will, I believe, be found a true and wholeſome Obſervation of one of them: *Quotquot modice vino utuntur in febribus, facilius convaleſcunt, vires conſervant, & in priſtinum ocyus reſtituuntur* (*d*). Another of them goes yet

(*d*) Helmont. de Febr. c. 12.

yet further, and, in oppoſition to *Galen*, who forbids Wine when the Fever is vehement, when there is Head-ach or *Delirium*, or when the Fever is owing to, or follows Inflammation of any of the *Viſcera*; even in theſe Caſes, he ſays, *Magnâ quantitate ſumptùm omnem vehementiam ſedat, nam qualitate narcoticâ colligit ſenſus, ſomnum conciliat, deliria & dolores acutiſſimos capitis imminuit, aperit obſtructiones unde oritur putredo, & concoctionem adjuvat* (*e*). This I can confirm from my own Experience, having given it in high Ravings, Head-ach, Toſſing, and Watching, and where the Eyes were much inflamed, with wonderful Effect, the Sick having been compoſed by it, and Sleep procured, when Opiates failed, or I durſt not give them. Nor do I find it leſs ſafe where Sleepineſs attends. It is not at all doubted that Wine reſembles *Opium* in its Virtues, Operation and Effects, requires the ſame Methods of Cure, when abuſed, and ſupplies the Place of it to thoſe who have diſuſed it: But, as a fermented Liquor perhaps, it does not, when moderately uſed, leave behind it ſuch a great Depreſſion and Relaxation as *Opium*, rather quickening the Pulſe, which *Opium* renders ſlower. Wine muſt then be uſeful, as it is hypnotic, and a ſafe anodyne. ——By the agreeable Senſation it gives to the Stomach, it is highly refreſhing, comforts the Bowels, and raiſes the Appetite.——It affords a fit *Pabulum* to the Blood; filling it with warming ſpirituous Parts, ſtrengthens the Solids, and inſtigates their Motions; in the due Action of which, to keep up a due Force of Circulation,

(*e*) Whitakerus Tract. de ſang. uvæ.

the ſeveral Functions are maintained.——Gently aſſiſting therefore, and cheriſhing the languid Powers, it promotes all the natural Evacuations, without increaſing the Diſtemper.——For it is not convertible into the Matter of the Diſeaſe; but, by oppoſite Qualities, reſiſts, or is an Antidote of theſe particular Vices and Corruptions of the Fluids that cauſe the Fever.——If the Fluids, moving ſlowly, are diſpoſed to ſtagnate, and form Obſtructions; by quickening their Motions it will prevent and remove ſuch Stagnations, and ſo becomes a true and effectual Digeſtive; and till a more demonſtrably certain one is diſcovered, I ſhall believe this to be the ſureſt Mean of Concoction. I have tried it much, and with great Freedom; and therefore can ſay it with ſome Aſſurance, that, in all great Caſes, *(Quid poteſt majus poteſt minus)*, Wine, and chiefly Wine, is to be depended upon, when an uſeleſs Heap of nauſeating Medicines muſt be thrown aſide. And here I take the Liberty to tranſcribe a Paſſage from an excellent Author altogether to this Purpoſe, having beſides a Relation to the whole Subject. *Et quidem in febribus malignis vino nil datur excellentius. Malignitas dignoſcitur ex motuum & virium defectu, nec non valde depreſſa ſanguinis ſpirituaſcentia, ex tardo circulo ejuſdem: quæ cuncta diſpoſitionem quandam cruoris ad putredinem deſignant. Igitur in iis morbis reſtaurare vires, ſpiritus erigere, circulum ſanguinis liberum reddere, tranſpirationem movere, expedit: & in eo verſatur omnis alexipharmacorum virtus. Quod autem vinum hæc omnia præſtet, nolumus pluribus authoritatibus, quibus practicorum*

rum libri ſunt pleni, confirmare; ſed confugimus ad ſolam experientiam, quâ nobis conſtat, plures ex malignis evaſiſſe ſolius vini moderato uſu (f).

It muſt not be imagined, that I am here contending for an unlimited Uſe of Wine in Fevers. There are Conſtitutions both of the Diſeaſe and the Patient, where it is plainly forbidden. But whatever Inconveniency may attend the Uſe of it, it carries this Advantage along with it, that it very ſoon ſhews its Diſagreement, by the immediate Diſorder it cauſes, which is an early Caution to deſiſt from it; and there can be but ſmall Hazard in making an Experiment. In adviſing it therefore I am guided by a very plain Rule. If it does not give Uneaſineſs to the Stomach; if it does not raiſe Heat and Thirſt, with an Increaſe of the Fever, Reſtleſſneſs and Raving; much more if the Sick are refreſhed, compoſed, and inclined to ſleep by it, have greater Freedom from their Sickneſs, or are better ſupported under it, I preſently conclude it to be a ſafe and ſuitable Remedy, that it muſt do good; and, without Fear, enjoin the Continuance of it, in ſuch Quantity, Time and Manner, as the Diſeaſe ſeems to require, and the Sick can bear. Nor is the Choice of Wine an indifferent Matter, even in thoſe Conſtitutions that will admit the Uſe of it. In moſt Caſes I have uſed Canary; which anſwers beſt where a *Lentor* in any Degree is ſuppoſed to prevail, and accompanied with Tenſion. But there are ſome, eſpecially in long Fevers, who, from a ſmall Quantity, are much heated and ruffled; ſuch will agree better with a ſtrong, old,

(f) Frid. Hoffman. diſſert. phyſ. med. IX.

old, ſound Claret, and bear it in good Quantity; for, by ſtrengthening remarkably the Tone of the Veſſels, it is uſeful to repreſs all ſudden Rarefaction or Agitations the Fluids are diſpoſed to; and, by ſtoring the Blood with auſtere and reſtrictive Parts, hinders a further Colliquation of it. But it ſeems to be a good Rule, to allow the Sick their favourite Wine.

When we obſerve the little Succeſs that ſo often attends the common Methods of Cure in Fevers, we naturally wiſh for, and are led to inquire after ſome other and more certain Method. He at leaſt who is anxious for his Patient, and wiſhes the Advancement of his Art, will do ſo. *Bathing* the whole Body, or the largeſt Surfaces of it, preſents itſelf to us with conſiderable Advantages. When the Blood-globules are heated, and ſo may become too fierce, leſs fluxile, or eaſily diſpoſed to Rarefaction: When, with reſpect to the red Globules, there may be a Redundancy of acrimonious *Serum* in its Veſſels, and ſtagnating Lymph in the Glands: When the remote Veſſels from their natural *inertia*, or being overcharged, are not able to puſh on their Contents: When the Veſſels are rigid from a Spaſm, or parched and collapſed through Heat and Inanition: And to one or more of theſe Circumſtances (in which the Malignity conſiſts) a general Defect of the Fluids is joined: When this is the Caſe, I ſay, a ſpeedy and powerful Remedy is required, that the Patient may not be left to the tedious and uncertain Event of Coction, which, for moſt part, is attended with certain Danger. A *Bath* applied to the whole Body, acts immediately

ately upon all the Veſſels, and the Virtues of it are as inſtantly communicated to the whole Maſs, by the numerous bibulous Veins upon the Surface; and, at once, as it were, the Solids are relaxed, the Veſſels are filled, the Body is nouriſhed, the Blood is cooled, the Fluids are attempered, and a due Degree of Warmth and Motion imparted. And hence, if any thing can poſſibly effect it, there muſt neceſſarily enſue a ſudden and total Change of Cauſes and Accidents; while theſe do not exceed, but ſtill obtain the proper Conditions to be acted upon, according to the ſtrict Laws of Mechaniſm and the OEconomy. Theſe Ends are anſwered in this Way, more certainly and expeditiouſly, than by the moſt methodical Courſe of Medicines, often inſignificant in themſelves, and given in as trifling Doſes, which cannot produce their Effect, till they have gone the long Round of Circulation; and what Changes they may undergo, we know not. We attempt ſomething of what is here propoſed, by theſe partial Bathings that are in uſe, and when we make Applications to different and more ſenſible Parts of the Body, under the ſounding Names of *Frontalia*, *Suppedalia*, &c. And we have obſerved no ſmall Benefit even from theſe. But this Relief is greatly diſproportioned; and I do not ſee the Hazard of carrying the Thing a much greater Length; for by doing what we do, we acknowledge the Reaſonableneſs and Neceſſity of doing much more.

Facts, and the Reaſon of the Thing are ſtrong enough to overcome the graver Arguments brought againſt the Method here recommend-

ed;

ed: At leaſt our Experience of it is ſo ſmall, that it cannot thence be determined what the real Danger of it is; which is the only Objection that in Juſtice ought to be made to it: Yet becauſe of a common Miſtake and groundleſs Averſion, we continue ſtill to be deprived of one of the nobleſt Aſſiſtances Nature has yet afforded, or ſhall ever perhaps be in the Power of Art to invent. Bathing of all kinds obtains now in a long Tribe of chronical Ills; why not in acute ones too, Regard being had to the Diſeaſe, Climate, Manner of Bathing, condition of the Sick, and other Circumſtances? The ſeeming Severity or Indelicacy of a Method ſhould not, when Life is at Stake, deter us from it; nor, while this remains untried, has the deſpairing Patient been allowed every fair Chance for Life.

The Opinion of the Antients as to Bathing, is clear and expreſs; and their Example, to whoſe Honeſty and Induſtry we are ſo much obliged, ſhould not a little determine our Practice in this Matter. To quote one of them ſhall at preſent ſuffice: *In a ſimple Fever Bathing is neceſſary, the ſame as in other Waſtings,* [*Drineſſes*], *of whatever kind they are, whether hot or cold (g).* And in many other Places he ſpeaks to the ſame Purpoſe. We may be taught the Thing even from the more barbarous Nations, who plunge their Sick into cold Water, or wrap them in Snow, and thus preſerve them; being unacquainted with a more refined and delicate Practice, and I believe a more ineffectual too. It has been known likewiſe to check, and effectually

(g) Galen libro de Maraſmo.

effectually remove the higher Symptoms of Malignity, ſuch as Spots and Hæmorrhage. The irrational Creatures, wiſely guided by Inſtinct, have Recourſe in their Heats and Diſeaſes to Bathings. Referable to this Head are many Irregularities committed by the poorer ſort in their Illneſſes, which we think very hurtful, and often wonder they are not killed by them. But if we conſider Things well, we ſhall find, that what they do, though it may have bad enough Conſequences ſometimes, is in the main right, and perfectly agreeable to a ſound Philoſophy: For the Diſeaſe is frequently cured by what we reckoned a dangerous Tranſgreſſion. It is from our Obſervations upon the Poor, and moſt inculti-vated of Mankind, and Brute Animals, aſſiſted and confirmed by ſome Chance-diſcoveries in Medicine, that we muſt frame a true Syſtem, founded in, and conſonant to Nature, and purged of all learned Uncertainties, and perverſe Notions of Science; as well as of many impoſing Delicacies, Devices of Craft, and the Impertinence of Faſhion. A great many Reaſons and Authorities might be adduced in favour of what I have ſaid; but I do not pretend to inforce any further a Practice ſo much ſuſpected, perhaps abhorred. If ever it ſhould come into Credit, a good deal of Judgment will be required in the Contrivance of Baths, which muſt be ſuited to the Nature and Degree of the Fever. They would conſiſt chiefly of Water, warm or cold, ſimple or medicated; Broths, Milk, Vinegar, or ſomething more ſpirituous, by themſelves or compounded.

Thus,

Thus, Sir, I have, without Reſerve, given you my Sentiments concerning theſe Matters. I need not attempt to perſuade you who know me, that neither Fondneſs for my own Opinions, affecting to differ from others, or Deſire to appear ſingular in any Opinion, were my Motives in writing. If it could at all profit the Subject, or oblige thoſe whom I am always ready to pleaſe, I was willing to offer a few Hints, (founded, I am certain, as to the practical Part, upon Obſervation, and agreeable, I hope, in Theory, to the Nature of Things), which better Judges might poſſibly improve, to the further Advancement of the Healing Art.

XLIX. *Anomalous Agues cured, by Mr.* DUNCAN BAINE, *Surgeon in* Pembroke.

THE intermittent Fevers have of late Years appeared frequently in very irregular Shapes; when the common Method of Cure cannot be followed; and often the poor Patients are thrown into violent Diſorders, when that common Method is uſed, and the Ague is attempted to be put away, before ſufficient Evacuations have been made. You have recorded, in your Volumes already publiſhed, ſeveral Hiſtories of this kind; but, believing that ſome more Examples of the Cure of anomalous Agues, where ſucceſsful Cures were made by different Methods, would not be unacceptable to you, I ſend you the two following Caſes.

John Rheniſh, a Farmer's Son, about twenty ſix Years of Age, of a ſtrong plethorick Habit of Body,

Body, who had laboured under an Ague half a Year, for which he had taken a great deal of the *Cortex*, and other uſual Medicines, aſked my Advice, 30th *Auguſt* 1736. While I was diſcourſing with him, and inquiring into his Caſe, he was ſuddenly taken with a violent ſtamping of his Feet; and the Convulſions gradually aſcended from the Soles of his Feet, to his Legs, Thighs, Belly, Back, and Shoulders. After which his Head was moſt violently convulſed, with a total Deprivation of Speech; but he had a moſt diſmal Vociferation, that might have been heard at a great Diſtance; his *Abdomen* and *Thorax* working and heaving violently and unuſually in the mean time. This Fit having laſted half an Hour, a total profuſe Sweat broke out; which relieved him; and he could then anſwer the Queſtions I put to him. He told me, That he had ſeveral ſuch Fits of late; which made his Neighbours conclude him bewitched: That he imputed them to a Fright he had got in this Month of *Auguſt*; for, ſleeping on the Graſs, when he awaked, he ſaw a large Adder coming towards his Face; and getting ſpeedily up, in a Fright, went home, and was immediately ſeized with one of theſe Fits; which had returned ſometimes twice a Day, at the ſame Time when his Ague uſed to return. During the Paroxyſm, his Pulſe was very high and quick, his Face much inflamed, and his Eyes ready to ſtart out of his Head. After the Fit was over, he complained of a moſt torturing Pain of the Bowels. His Tongue was generally moiſt; and he had a Suppreſſion of Urine.

That Afternoon I gave him *Sal. vitriol.*

Drachm. i. *Oxymel. ſcillit* Unc. 1. which operated very moderately. Next Day he took a ſtrong Doſe of *Tinctura ſacra*, with ſome Drops of *Sp. Lavendul.* and an Ounce of *Syrup. de Rhamno*, which purged him well; and his Paroxyſm returned an Hour later than the Day before.

September 1ſt, I ordered ten Ounces of Blood to be taken at his Arm, and gave him frequently ſome Spoonfuls of a Julep, compoſed of *Aq. Roriſmarin. Salv. Rut. Lavendul. ſimpl. Aq. Pæon. Bryon. comp. Sp. Lavendul. Sal. volatil. oleoſ.* and *Viſc. quercin.* in which he alſo ſwallowed a *Scruple* of *Pulv. de Gutteta* in the Morning, Afternoon, and at Night. The Blood being very ſizy, I ordered him to be again blooded next Day, and at Night gave him the *Pilul. anticolic.* at Bed-time, which operated very well towards the Morning; and that Day he eſcaped the Fit. At Night I gave him the following Bolus, ℞. *Pulv. antepilept. alter. Quincy*, Scrup. ii. *Cort. Peruvian.* Drachm. 1. *Sal. abſinth.* Gr. x. *Laudan. liquid. Sydenham.* Gutt. xx. *Syrup. Pæon. q. s. ut f. Bol.*

Sept. 4th, He began to uſe this Electuary: ℞. *Pulv. antepilept. alter.* Drachm. ii. *Cort. Peruvian.* Drachm. vi. *Sal. abſinth.* Drachm. ſem. *Syrup. Pæon. q. s. m. f. Electuar. cujus cap. molem. n. m. tertiâ quâque horâ ſuperbibendo cochlearia quatuor julep. priùs præſcript.* His *Quotidian* Fits changed into *Tertian*, and were not near ſo violent.

Sept. 8th, He took a Vomit of *Ipecacuanna*, which vomited him well enough; but, not having purged him, I ordered a Clyſter at Night, and after it gave him an Anodyne of *Philon. roman.*

man. which always gave him great Relief from thoſe Pains of his Bowels which came after every Fit.

Sept. 9th and 10th, He continued the Uſe of the *Electuary* and *Julep* laſt preſcribed.

Being ſtill much troubled in his Bowels, and ſometimes convulſed, I gave him a *Scruple* of *Calomel* on the Evening of the 11th, and purged it off next Morning, quieting all at Night with the *Philon. roman.*

13th, 14th, 15th, He took the *Electuary* and *Julep.*

16th, 17th, 18th, 19th, He uſed the following Infuſion: ℞. *Pulv. cortic. Peruvian.* Unc. i. *Sal. abſinth.* Drachm. ii. *coq. ex aq. font. lib.* iv. *ad lib.* ii. *colatur. affund. rad. gentian. galang. zedoar. calam. aromat. ſerpent. virg. à* Drachm. i. ſem. *Cort. aurant. ſicc.* Unc. ſem. *Summit abſinth. roman.* Drachm. i. *Centaur. min.* Scrup. ii. *leni calore adhibito infund. per aliquot horas dein colaturæ adde Aq. theriacal. epidemic. à* Unc. ii. *Vin. chalybeat.* Unc. iii. *Sp. lavend. comp.* Unc. ſem. *m. cap. cochlearia ſex tertiâ quâque horâ abſente paroxyſmo.*

Sept. 20th, The *Calomel* with the Purgative and *Philonium* next Day were repeated.

24th, The Infuſion was given, and now being much better, he went home the 25th; but, his Fits returning, I ſent him eight Grains of *emetic Tartar*; and a little after he took a Vomit of *Turpeth mineral*; after which he had no more Fits. But I made him continue in the Uſe of an Electuary, compoſed of *Pulv. cortic. Peruvian. Viſc. quercin. Sal. abſinth.* and *Elixir. vitriol.* by which he recovered.

II. A Gentlewoman, aged thirty, who lived in low fenny Grounds, where ſhe and all her Family were frequently ſubject to *Agues*, was delivered by me here about ſix Weeks ago of a Son. The Labour being hard and difficult, ſome Days after ſhe complained of a Pain on the *Os iſchium*, which removed down to the middle of the *vaſtus externus* Muſcle; and came every Day at a certain Hour, throwing her into a violent Fever; which terminated in a Sweat; after which ſhe became eaſy, ate and drank as uſual. I gave her a *Vomit*, and Purgatives, and then preſcribed the *Bark*, *Elixir. vitriol.* and *antiſpaſmodic* Medicines, and applied a large Bliſtering-plaiſter to the pained Parts; by the Uſe of which ſhe is recovered.

L. *Remarks on the Management of the* Small Pox; *by Dr.* Thomas Simson, *Profeſſor of Medicine in the Univerſity of* St. Andrew's.

AS I have obſerved often to you in general concerning *acute Diſeaſes*, ſo I muſt now in particular as to the *Small Pox*, that nothing requires more Attention and Judgment, while they run their natural Courſe, ſo various in different Perſons, than to determine what the Phyſician's Preſcriptions contribute to the Changes they undergo. Since *Sydenham*'s Time, ſeveral Improvements have been made in the Management; but yet, notwithſtanding all that *Sydenham* advanced, and the lateſt Improvements, Practitioners are far from having agreed in the Method of Cure: And I myſelf, though initiated into

into *Sydenham*'s Practice, of which in moſt Diſeaſes I have been a great Admirer, found a Neceſſity to break off from him in the *Small Pox*; but not for what he was moſt conſpicuous, and had the greateſt Oppoſition, as he ſtill has, the *cool Diet*; but for that Piece of Management wherein he and his greateſt Adverſaries ſeem to agree, the keeping the Patient conſtipated thro' the whole Time of the Suppuration; and the ſupporting the Swelling of Head and Hands, *&c.* by a conſtant Uſe of the *Syrup of white Poppy*.

I am much ſurpriſed, that ſuch an attentive Phyſician as *Sydenham* could ſee ſo many Patients monſtrouſly ſwelled, dying delirious with *Angina* and *Peripneumony*, as moſt of them die after the Height, without ſuſpecting the damming up of the Liquors in Time of the Suppuration as the great Cauſe of it. True it is, that, in the very worſt kinds, before the Height, they die, with a moderate Swelling only, and often with a very ſmall Degree of a Fever; as in theſe Fevers which have got the Name of *nervous*. But this, in my Opinion, was ſo far from ariſing from the Liquors being too little puſhed towards the Surface, that it aroſe wholly from the Precipitancy of the Run that Way, by which the Circulation was quite ſuffocated in the capillary Arteries, and no Acceſs allowed to the ſerous Veſſels; hence Gangrenes, *&c.* the ordinary Concomitants of ſuch Inſtances; and conſequently the more in them we puſh the Fluids to the Surface, to which they naturally flow in this Diſeaſe, we haſten the bad Symptoms; as we likewiſe do in the more moderate Caſe, where the ſerous Veſſels get Supplies, but ſo largely as to

compreſs the Parts about, and deſtroy their Action. In both which Caſes it is evident, that nothing ſhould do more Service than the Subſtraction of ſome of that Matter with which theſe Veſſels are deſtroy'd or overloaded: For which purpoſe I know nothing ſo ſerviceable as moderate purging; which, in all other inflammatory Caſes, where we fear too great a Diſpoſition to Suppuration and Gangrene, we always fly to, as ſoon as poſſible, this carrying off a greater Proportion of the vitiated *Serum*, than the good Blood, and being carried on with leſs Diſturbance to the Body than Salivation can be.

But this much for *Theory*, which I truſt little in ſuch Diſeaſes. I muſt now inform you, that finding, under a ſevere *epidemical Small Pox* raging here in the Year 1729, that ſome of the Patients under my Care, after the Suppuration, with which they ſeemed at firſt to be eaſed of the ſevereſt Symptoms attending the Eruption, fell a raving again; upon which I immediately ſuſpected the Syrup as the natural Cauſe of it, and ſuſpended its Uſe; which hitherto I had followed out in *Sydenham*'s Method; and diſtinctly found, that my Patients with dangerous Symptoms were always more free of raving and Fever when not uſing it; and ever ſince that Time I never propoſed it, except when a great Pain or Reſtleſſneſs accompanied the Suppuration; in which Circumſtances I have found it a charming Medicine. In this Situation, then, I began to examine the whole of *Sydenham*'s Method with ſomething of more Attention, and to conſider what the Uſe of the Syrup, ſo much inſiſted

ed upon in that Diſeaſe, could be, and with what Intention it was given.

I found evidently, by *Sydenham*'s Expreſſions in his Letter to Dr. *Cole*, that his Intention was, to keep down the *inflammatory Emotions* and *ſecondary Fever*; and, for this End, he made uſe of it once, twice, and ſometimes thrice a day; not only through the whole Time of the Suppuration, but long after it. How ill this paſſed with me, may eaſily be gueſſed from the Obſervations I had made in this Diſeaſe of late; which had ſatisfied me, that, for certain here, as we find in other inflammatory Diſeaſes, it raiſed both Fever, and, one of its worſt Symptoms, the *Delirium*. This I became convinced of when I found in *Sydenham*'s own Practice, that he was obliged to call in another Help againſt theſe feveriſh Emotions, particularly the *ſecondary Fever*, to wit, that of eaſy purging; though he did this ſeemingly againſt the Indications he had formed for his Management of the Diſeaſe in general, as we ſee by his Expreſſion, where he pleads for it in his *Schedula monitoria*; there he calls it a *Cuneus durus duro nodo*; though I would have reckoned, by the Way he introduces this, that he had ſuſpected the bad Effects of the Syrup, ſo far as to have been a juſt Reaſon for the more moderate Uſe of it in the firſt Steps of the Diſeaſe. *Cum verò*, ſays he, *ultimis morbi diebus haud rarò accidit, ægri alvum, partim à morbi natura, partim à magna paregoricorum vi, quorum opem planè depoſcebat medendi ratio, ita conſtipatam eſſe, ut tum fere ſuffocetur ille, tum febris ad eum gradum aſcenderit, ut jam de ægro penè conclamatum videatur.* So that his liberal

liberal Uſe of it was ſo far from quieting theſe feveriſh Fits, that he acknowledges it as ſharing in the Cauſe of them; as was moſt natural, conſidering the native Effects of this Syrup. I muſt then aſk, why ſuch a conſtant Uſe of it through the Riſe of the Diſeaſe, as he ſeems to have made, and as over all *Britain* his Followers ſtill continue to make? After all the Obſervation I could make theſe Dozen of Years bygone, I can find no Good to attribute to it, but what is another native Effect of it, the eaſing of Pains. I have ſeen Children toſſing with theſe in a moſt diſmal Manner, tearing their Fleſh with their Nails, eaſed as by a Charm by two or three Teaſpoonfuls of it, and after that go through their Courſe perfectly eaſy, and getting timeous Reſt; ſo that nothing could be more deſirable than its Effects. But becauſe when given in ſuch Straits with Succeſs, ſhall we loſe the View for which it was certainly at firſt given, and give it in all Circumſtances contrary to the moſt plain Indications? What more juſt and natural in a Diſeaſe abounding with putrid Matter, than gradually to make a Subſtraction of it, and to keep an open Belly rather than dam up the whole Secretions, the native Effect of this Syrup? But it may perhaps be replied, That, by this means, the Hands, Face, and the Puſtules themſelves, would be made to ſubſide before the Blood was duly purged from the Infection. This, I ſuſpect, has been the Reaſon why Evacuations of all Things have been ſo much objected againſt in the Riſe of the *Small Pox*; it being judged that the ſuppurated Matter was caſt out from the Maſs, and that the Matter which ſwelled Face and Hands ſup-

plied

plied or ſupported it. But I look upon all theſe as indigeſted Notions, which have ſerved for nothing but to eſtabliſh a very bad Practice; the *Small Pox* being indiſputably a Diſeaſe of the Skin, which firſt inflames, and then ſuppurates; to accompliſh which nothing can contribute more than a free Circulation about the external Parts of the Body, which the Swelling, going beyond Bounds, very much impedes. So that the Increaſe of the Swelling and Puſtules themſelves ſhould be looked upon as two very different Things. Theſe cannot riſe too much; but the other, as I have often obſerved, when exceeding, is the Introduction to the very worſt Conſequences of this Diſeaſe; as I have ſeen it in Caſes where the Puſtules themſelves were few, and of a juſt Magnitude. And what can we expect when the Body is all over œdematous with a Fever, but *Deliriums*, *Peripneumonies*, Extravaſations of Blood, *&c.*?

To evite theſe was the View with which I firſt became ſparing in the Uſe of the *white Poppies*; and which ſince has made me venture, through the whole Time of Suppuration, to procure to my Patients the ordinary Courſe of their Belly at leaſt: And, I muſt inform you, with moſt agreeable Succeſs; for I never find the *Small Pox* keep up better, and the Patient eaſier, than under this Regimen. So that I had between three and four Dozen this ſame Year, moſt of which were of the coherent kind, and ſome confluent; few of which had ſo much as the Appearance of a Fever upon the Turn of the Diſeaſe. They drank ſmall Beer and Whey, and ate boiled Prunes at Pleaſure. In the mean time, in ſmall

Fiſher-

Fiſher-Towns, under no Phyſician's Care, I have known eighteen or twenty die of the ſame Small Pox, where ſcarce twice that Number had been infected; which in all their Symptoms agreed much with what the diligent Dr. *Huxham* deſcribes as raging at *Plymouth* in the Year 1724 and 1725, (*Philoſophical Tranſactions*, No 390.). And what Surprize is it, that they ſhould make ſo much Havock, when, perhaps, from the Beginning to the End of the Diſeaſe, the Patient is not allowed one Stool! boiled Milk and Water, Groat-broth and Syrup making up their Management; for every Nurſe through the Country knows the Uſe of it. To Infants this Management muſt be ſtill more fatal, for they at no Time can be eaſy under Conſtipation; and yet theſe are handled the ſame Way. I have found them five or ſix Times a-day at Stool with the beſt Effects. Nor did I ever ſee a ſudden collapſing of the ſwelled Parts by inſiſting on this Method; I mean, by keeping up the natural Courſe of their Belly, or even making them more open, when an exceſſive Swelling calls for it; under which, as Dr. *Mead* obſerves in his Letter to Dr. *Freind*, you will often find them expiring: And therefore I have always made it one Part of my Management, even under the Riſe of the *Small Pox*, and Suppuration, to keep it at under. And *Sydenham* allows, in his Hiſtory of the regular Small Pox, that the open Belly at theſe Times is the only Thing that ſaves Children, as Salivation does the elder Patients. What can we conclude from this, but that ſome Evacuation of the *Serum* under theſe Swellings is neceſſary; and that we are pleaſed when it happens

pens of itſelf? But why not imitate Nature, and carry on her Work when too tardy? You agree; but ſay, the ſame Outlets which Nature chuſes are to be ſought after by us. I demand what makes one Evacuation ſerviceable to one, and not to another? Nothing, in my Opinion, but becauſe in theſe different Subjects the Acceſs of ſerous Liquors is different. In the younger, much given to purging, when the Veſſels are loaded, the Liquors readily break out by the Inteſtines: In the elder, when they cannot make their Way downward, they ſhow their Force at the ſalival Glands; but with a great deal more Hazard; becauſe this cannot happen till all the Parts about are over-diſtended, though ſometimes the Guts yield. But then our Prejudices againſt their Service is ſo great, that we do all to divert this Evacuation upon the firſt Appearance; though, if it were more favoured, I doubt not but we ſhould frequently ſee the good Effects of it: And this not only from what I have found, by forcing moderately this Evacuation; but from a general Obſervation of Dr. *Wintringham*'s concerning it, when happening naturally; who, in the 63d Page of his *Commentarium Noſologicum*, has this juſt Remark: *Jure quidem horrent medici Diarrhœam vires proſternentem, ptyaliſmum ſiſtentem, faciei & extremorum tumefactionem impedientem: hunc verò effectum à tali alvi ſolutione ortum, me nunquam obſervâſſe memini; ſed è contrà, juvenibus ſanguinolentis, ætate & viribus florentibus, hanc praxin ſæpe utilem novi.*

This is moſt agreeable to what the long experienced Phyſician *Hoffman* obſerves in his Hiſtory of the epidemical Small Pox 1698; in which he

he ſays, *Diarrhœas ſiſtere periculoſum fuit.* And in his third general Rule for Practice in this Diſeaſe, he obſerves, *Frequens juvenili imprimis ætati ſymptoma eſt ſalivæ fluxus; qui ſuppurationis tempore ut plurimum effuſior accidens, non modo hanc, ſed & ſomnum non ſine periculo impedit. Moderandus igitur tam per alvi ſolutionem mediante clyſtere emolliente, quam,* &c. And who would not ſuſpect Hazard under ſuch terrible Swellings as happen in this Diſeaſe, upon the riſing of a Fever, with which it is often accompanied at the Turn of the Diſeaſe?

I hope, then, what I have advanced ſhall bring Practitioners to inlarge their Views; and not, out of a raſh Proſpect of keeping up the Puſtules and Swelling, ſtifle their Patients. The Diſeaſe, at the Time the Surface of the Body inflames and ſuppurates, abounds in a ſuperfluous *Serum*; which rather impedes, than advances the Suppuration; and which, dammed up in the ſerous Veſſels, heightens all the bad Symptoms in the Turn of the Diſeaſe: Whereas, by keeping the Body moderately open, by Prunes, Cow-whey, Clyſters, and the ſofter Drinks, all the Paſſages for the Secretions are kept open, and ready to help at this Period, and that without diſturbing the Small Pox themſelves; as a Dozen of Years conſtant Practice has now confirmed to me. And therefore I muſt recommend this Method to this Part of the Country; who ſeem ſtrangely prejudiced againſt it, and ſeldom allow the Diſeaſe to take a Courſe downwards; which oft it would do, if left to itſelf. Not that I neglect the Syrup of Poppies; but when I uſe it, for giving Reſt, and eaſing Pain, I am always ſure,

ſure, at the ſame time, to give a Clyſter; which makes it much more ſucceſsful; and by this means I ſee what its Service is: Whereas, in uſing it as *Sydenham* did, it is hard to tell what we deſign by it. It is uſed as a Specifick, at the Time all its Effects are contrary to what we ſeek for, the freeing our Patients from a Load of putrid Humors. But this I reckon ſufficient for an Advertiſement, to make the Phyſician who wiſhes well to his Patient, examine the Courſe he fixes in.

LI. *A Hiſtory of the* Rabies canina: *by Dr.* Andrew Plummer, *Profeſſor of Medicine in the Univerſity of* Edinburgh.

A Young Gentleman, about ſeventeen Years of Age, who had been Apprentice to a Surgeon in the Country, and had come to *Edinburgh* for his Improvement, about the Beginning of *December* 1728, was bit by a Dog in the middle Finger of the right Hand, about the Middle of the Nail. At firſt he ſaid the Dog belonged to a Perſon of his Acquaintance; which Dog had no Symptoms of Madneſs at the Time: But afterwards he affirmed, that he was bit by a ſmall Dog, which he obſerved ſtraggling on the Streets, when he was endeavouring to catch him; and that he never knew what became of the Dog. The Wound gave him very little Trouble at firſt; and he ſoon cured it in the ordinary way.

In the Beginning of *January* 1729, he firſt complained of Pain in that Finger, reaching along the Back of the Hand to the Elbow, accom-

panied with a Numbneſs of the Finger. In the Night betwixt the 6th and 7th of *January*, he was very hot and reſtleſs, the Pain ſtill increaſing; ſo that next Morning he went to Dr. *Charles Alſton*, to aſk his Advice. He ſhewed him his Hand and told him, that he had been bit by a Dog ſome Weeks before; but that the Dog was ſtill alive, and well. The Doctor adviſed him, to uſe an emollient and anodyne Fomentation, and a cooling Diet. Accordingly he fomented his Hand for ſome time that Evening; and, having taken ſome light Slap for Supper, went to Bed: But the Sharpneſs of the Pain made him toſs all Night, and put him in a great Heat and Sweat. Being very thirſty, he roſe in the Middle of the Night, to get ſome Water or Small Beer to quench his Thirſt. When he got the Liquor, he found that he could not drink ſo much as he inclined, becauſe of ſome Difficulty of ſwallowing. In the Morning, he attempted again to drink; but the Liquor had ſcarce reached his Throat, when he was ſuddenly convulſed, let fall the Cup, and ſaid to his Comrade, that he was almoſt choaked. Some Hours after, when he was getting out of Bed, he ſtaggered, and complained of Giddineſs of his Head and Sickneſs at his Stomach; and intreated his Comrade, to bring Dr. *Alſton* to viſit him. The Doctor having heard his Complaints, and finding him ſtill hot and feveriſh, and his Hand much pained, ordered him to be blooded immediately, and to have a Purgative Ptiſan given him as ſoon as poſſible. After letting ten Ounces of Blood, the Pain of his Finger abated, and he found himſelf eaſier. When the Ptiſan was brought,

brought, he made many Excuſes to ſhift the taking of it; but, at the Intreaty of his Friends, he made ſome Attempts; and declared he could not ſwallow it. In the Evening he was perſuaded to try if he could get over a little ſoft Bread ſoaked in Sack-whey. He took it into his Mouth, rolled it about for ſome time; but, when he was about to ſwallow it, he ſpit it out ſuddenly, and with a convulſive Motion. However, that Night he ſlept pretty calmly, and had a moderate Sweat upon him. Next Morning he appeared ſomewhat diſordered, ſpoke incoherently, fetched deep Sighs, complained he could not breathe, and that ſomething interrupted the Motion of his Heart. About eleven in the Forenoon, Dr. *Alſton* came to viſit him. He found him very uneaſy, toſſing his Head, and ſhifting Poſtures. He obſerved that his Mouth was frequently diſtorted, and other Muſcles of his Face convulſed; his Breathing quick; and his Pulſe frequent, but feeble. He aſked him to take a little of a Cordial which was at hand. He ſaid, he durſt not attempt to ſwallow; for it would choak him: But being preſſed to try it, he put the Glaſs to his Mouth, and poured in the Liquor ſuddenly; but he as quickly threw it out again, with a kind of Horror and Shivering. The Doctor perceiving theſe extraordinary Symptoms, and apprehending the Lad to be in the greateſt Danger, went to the Elaboratory about twelve o' Clock, where he expected to meet with ſome of his Colleagues the Profeſſors of Phyſick, and carried Dr. *Rutherford*, Dr. *St. Clair*, and me, along with him to his Patient, and at the ſame time, ſent to Mr. *Monro*, to meet us there.

We found him very much diſordered, like one in an Agony, toſſing his Head and his Arms. His Face was red and blotted, his Eyes wild and ſtaring, conſtantly ſquirting out his Spittle; ſometimes ſtarting up ſuddenly from his Seat, then throwing himſelf down upon the Bed. Yet he anſwered Queſtions that were put to him pretty compoſedly: Only he would now and then ſtop ſhort of a ſudden, and beg that ſuch a Perſon, who was his moſt intimate Friend and Comrade, might not be admitted into the Room; for he could not bear the Sight of him, nor hear his Name mentioned; but could give no Reaſon for it. He was deſired to ſip a little Liquor out of a Tea-pot; he attempted it with great Reluctancy; but ſpit it out immediately, appearing to be in the greateſt Diſorder; complaining, that his Breath was quite ſtopped. The Phyſicians retired to a Coffee-houſe, to conſult if any thing could be attempted with any Probability of Succeſs, and carried along with them the young Man who had been the Patient's Bed-fellow and moſt intimate Companion, that they might be better informed of all that had happened to him. He aſſured them, that, though he had told Dr. *Alſton* that his Finger was bit by a Dog belonging to a Friend, which was then well, without any Symptoms of the *Rabies*; yet, when he returned home, immediately after the Bite, he ſaid it was given by a Dog ſtraggling in the Streets, with a Collar about its Neck; and that he never ſaw the Dog more. He informed them likewiſe that the unhappy Lad, at the Time he was bitten, had a Gonorrhæa, for which he had been taking Medicines privately: That his Method

was,

was, to take a Doſe of *Mercurius dulcis* at Night, and early next Morning ſome Purgative; the Operation of which was generally over about Mid-day: After which, he uſed to attend his Profeſſors, and go about any other Buſineſs. The Phyſicians had not ſit long, when another young Man, a Comrade of the Patient, came in; telling them, That, ſoon after their Departure, he found himſelf much worſe, and believed he was a-dying; and therefore intreated him, to call back the Phyſicians: But, as he was going out, the Patient run after him, and fell upon him, in a moſt outrageous manner; and would have done him a Miſchief, if the People of the Houſe had not come to his Aſſiſtance: That he was carried back to his Chamber quite furious: That two Men were ſcarce able to keep him in his Bed; and that the Vein which had been opened the Day before, had burſt open by the Violence of his ſtruggling, and was bleeding exceſſively. As he lodged in my Neighbourhood, I went along with the young Man, to ſee in what Condition he was then, and if any thing could be done for him. It was the moſt diſmal Spectacle I had ever ſeen. He was roaring and foming, gnaſhing his Teeth, endeavouring to bite and tear any thing he could come at, with his Hands and Teeth: He would bounce with ſuch Force, as to heave up a Man that was lying acroſs him, and make the Bed ſhake: His Face, Breaſt, Hands, and Linen, were all covered over with Blood and Sweat. After he had almoſt exhauſted his Strength, and was panting for Breath, I ſpoke to him. He knew me; and anſwered pretty calmly. I told him, it was neceſſary his Arm

ſhould be bound up, leſt he ſhould faint or die by Loſs of Blood. He agreed. And, as no body elſe ſeemed fond of the Employment, I put a Compreſs and Roller about his Arm, and wiped the Sweat and Blood off his Face. As near as I could gueſs, from the clotted Blood, his Linen and Bed-cloaths that were wet with it, he had loſt about twenty Ounces of Blood in this Fit; which had laſted near an Hour. In this calm Interval, I aſked him, if he would drink? He ſaid, he deſired nothing more; for he was exceeding thirſty. I took up a Jug that was at hand, with Milk and Water, and put it to his Mouth. He ſnapt at it greedily, and fixed his Teeth in it: He took in a Mouthful of the Liquor; but ſquirted it out again. He was inſtantly ſeized with a violent Convulſion; which was followed by a vomiting of a bilious Phlegm, with ſome thick black Matter, like clotted Blood. Then the furious Paroxyſm returned; he raved, and ſtruggled, and attempted to bite. I adviſed, that he ſhould be bound carefully to the Bed; and that proper Perſons ſhould look after him: Which was done. Mr. *Monro* and I returned in the Evening. He was foming at the Mouth, making a hideous Noiſe, rolling about his Tongue, and making ſuch a Sound as Children wont to do when they deſpiſe one that talks to them as a Babbler. He had a convulſive Motion like the Hiccup, but ſtronger; and his Face was frequently diſtorted with Spaſms. Even at this Time he knew Mr. *Monro* and me, though he raved inceſſantly. He continued in this Condition till ſix at Night; when, his Strength being quite exhauſted,

exhauſted, he lay motionleſs for half an Hour; and then expired.

LII. *An Apoplexy, occaſioned by a Fall from a Horſe; by Dr.* CHARLES AYTON-DOUGLAS, *Phyſician in* Fife.

ON the 19th of *July* 1737, *Andrew Reid* in the *Coaltoun* of *Balgony*, in the County of *Fife*, a robuſt Boy of thirteen Years of Age, when at a full Gallop, fell from his Horſe; and theſe who were in Company with him, were ſo barbarous, as to ride on their Journey without aſſiſting him. The Place where he fell being three or four Miles from his Father's Houſe, it was three Hours before his Friends found him, lying apoplectic in the Place where he fell. As ſoon as they got him home, they cauſed him to be blooded, and put him to Bed. Nothing more was done for him, until the 22d, at ſeven in the Evening; when I was called; and found him a-bed, in ſo profound a Sleep, that we could not ſo much as make him to look up, although we pulled his Hair, and pinched his Skin in ſeveral Places; and he had remained ſo ever ſince his Fall. His Pulſe was ſomewhat low, and not frequent; and he breathed tolerably well: He had not vomited any, there was no Inflammation in his Eyes, and I could diſcover no external Wound or Bruiſe.

I ordered him immediately to be taken out of Bed, and put in a Chair; and adviſed them to keep him ſo as much as they could, that, the Veſſels of the inferior Part of the Body being more preſſed

preſſed by their contained Fluids, and conſequently more diſtended, a Revulſion might be made from the Head; and that, the Veſſels there being more emptied, the extravaſed Blood might the more readily be abſorbed by the Veins, I immediately blooded him untill his Pulſe ſunk much, cauſed his Legs to be put in warm Water, and cupped and ſcarified the *Nucha*. When all this was done, we found his Head ſomewhat relieved; ſo that he ſometimes looked up, and anſwered us once or twice, when we called loud to him, and pulled his Hair. I ordered his Head to be ſhaven, that I might judge with more Certainty next Day, if there was any external Wound or Bruiſe; and deſired them to give him new-made Whey for his ordinary Drink, and for Food, Water-gruel made of Oat-meal or Wheat-bread; which he took with Appetite enough.

Next Forenoon I viſited him; he ſeemed ſomewhat eaſier than he was at firſt, but ſtill very *lethargic*, with his Pulſe and Breathing as the Day before. After a very ſtrict Inquiry, I could diſcover no external Wound or Bruiſe on his Head. I blooded him again to the Quantity of about eight Ounces, which ſunk his Pulſe for ſome Time, and I deſired to obſerve exactly the Directions formerly given as to Bathing, Diet, and keeping him out of Bed.

On the 24th he ſeemed much eaſier than he was on the 23d; ſo that frequently he anſwered us when we ſpoke to him; but he was ſtill lethargic. I cauſed him to be blooded at the jugular Vein until his Pulſe ſunk conſiderably, and preſcribed the following Purgative to be taken next Morning, being the 25th, which was

to

to be repeated on the 27th, ℞ *Rad. Jalap. pulv. ſcrup.* i. *Aquil. alb. gr.* v. *M. pro doſ.* And I adviſed them to give him plentifully of lukewarm Whey to drink during its operating. I obſerved that the letting Blood at the jugular Vein made a ſenſible Change on him for the better before I departed from him; and after he got the two Purgatives, which operated very well, he was no more lethargic. But his Judgment continued impaired; and he had loſt his Memory ſo much, that he could not read one Word, although before he got the Fall, he could have read very diſtinctly.

Two or three Days after the laſt Doſe of the Purgative, I ordered it to be repeated, and a *Seton* to be put in his Neck. The Purgative operated very well; but his Judgment and Memory continued as much impaired as formerly; and he would not allow the *Seton* to be put in, nor would his Parents allow it to be done by Force: Upon which I took leave of him, and told them that I would preſcribe no more for him until the *Seton* was tried.

I did not hear from him for two or three Weeks; in which Time he recovered his Strength, and was able to walk and ride; but he was ſtill very ſtupid, and his Memory as bad as ever, in ſo much that if he happened at any time to walk to the Diſtance of an hundred Paces from his Father's Houſe, he ſometimes could not find the Way to it without a Guide: And in this Caſe I found him about three Weeks after he had got the laſt Purgative; when his Father told me that he had prevailed with him to allow the *Seton*; ſo it was put in, and within

in eight Days he recovered his Memory and Judgment, and has continued to this Day, being ſixteen Months ſince his Fall, as diſtinct as ever, and in perfect Health. I adviſed the *Seton* to be kept in for five or ſix Weeks longer, and when it was taken out, the before-mentioned Purgative was twice repeated.

LIII. *An Abſceſs in the* Cerebellum, *and Rupture of the lateral* Sinus; *by Mr.* JOHN DOUGLAS, *Surgeon in* Edinburgh.

MR. *G. B.* aged nineteen Years, was taken with a Pain and Heavineſs in the Forehead, for which he was plentifully blooded, vomited, purged, bliſtered, *&c.* Notwithſtanding which he was obliged to ſit always with his Head leaning forwards, otherwiſe his Pain was greatly increaſed. His Pulſe in the mean time was good; he had no Convulſions; but his Appetite was bad, his Sleep broken, and in turning his Eyes quickly, he had an Addition of Pain.

After being three Months in this Way, he became free of Pain in an Evening, in the Beginning of *January* 1737; ate the Wing of a Hen, drank a Glaſs of ſtrong Ale; after which he ſlept well all Night. Next Morning he called for Tea, and immediately after fell into a ſeeming Faint, juſt as I happened to enter his Lodging. I opened a Vein in his Arm, but he did not blood, and in two Minutes died.

When his Head was opened, we ſaw two Ounces of perfect *Pus* contained in a ſuppurated

ted Tumor, formed in the middle of the *Cerebellum*, and an Opening of the left lateral *Sinus* of the *Dura mater*, out of which a considerable Quantity of Blood had flowed.

LIV. *The Dissection of a* cataractous *Eye*; *by* ALEXANDER MONRO, *P. A.*

December 15. 1736, in Presence of Dr. *John Taylor* Physician, and of Mr. *John Douglas* Surgeon in this Place, I dissected the Eye of a Man which had been examined while the Man was alive, by several Physicians and Surgeons, who all unanimously declared the Man to labour under a *Cataract* of that Eye.

The *Cornea* of this Eye was perfectly pellucid, without any Opacity in it:—The *aqueous* Humor seemed to be in due Quantity and Quality:— We could discover no Fault in the *Iris*:—The opac *crystalline Lens* inclosed in its *Capsula* was not so large as it is commonly in a sound human Eye; instead of being circular, it was of a triangular Form, and its anterior Convexity was scabrous and unequal, of a yellowish white Colour, the yellow Cast appearing much stronger after the Eye was opened, than it did while the Eye was entire:—— The Connexion of the *Crystalline* inclosed in its *Capsula*, to the *ciliary Circle*, and to the *vitrous Humor*, was much weaker than it is for ordinary; so that, by reclining the Eye to one Side, after the *Iris* was taken away, the Weight of the *Crystalline* made it separate on any Side from which I reclined it:—The posterior Convexity of the *Crystalline*

Cryſtalline was ſmooth, but of a more yellow Colour than the anterior Part of this *Lens*.

When an Inciſion was made into the *Capſula*, the included *Lens* ſeparated from it, without our being able to perceive any Connexion between them.—The *Capſula* was opac, but of a much whiter Colour than the *Cryſtalline* itſelf: —The *Cryſtalline* was nearly of the ſame Conſiſtence all through, without either watery or gelatinous exterior Subſtance, or being harder and firmer towards the Center:——It was all compoſed of a great many *Strata* of a greeniſh-yellow Subſtance, which became more on the green Caſt as we ſeparated the *Lamina* nearer to the Center, where we could obſerve no firm *Nucleus*:——The *vitrous* Humor was all clear and tranſparent:—— We ſaw no Fault in the *Retina*:——The Colour of the internal Surface of the *choroid* Coat did not ſeem ſo deep as it commonly is.

LV. *A Man dead in Appearance, recovered by diſtending the Lungs with Air; by Mr.* WILLIAM TOSSACH, *Surgeon in* Alloa.

I Muſt ſubmit to better Judges to determine, whether the Experiment I deſign to relate was the Mean of ſaving the Man's Life on whom it was tried. It is at leaſt very ſimple, and abſolutely ſafe; and therefore there can at leaſt be no Harm, if there is not an Advantage, in acquainting the Publick of it.

November 11. 1732, early in the Morning, an unuſual Steam was obſerved to come out of

of a Coal-pit in this Neighbourhood, belonging to the Honourable Sir *John Schaw* of *Greenock*; which the People who went down to inquire the Cauſe of it, found to be the Smoak of Coals that lay about ten Fathoms from the Bottom of the Pit, and were ſome Way or other ſet on Fire in two Places. This Pit, and all the others which had any Communication with it, were ſhut up cloſe, to ſmother the Flame, and continued thus ſhut till *December* 3. when they were all opened. The one where the Fire had been, ſent out a moſt nauſeous Steam, ſo that no body could come near it, except to the wind-ward. After ſome Hours the Colliers and others ventured down by the Ladders into this Pit, which was thirty four Fathoms deep; but ſoon came running up, all panting and breathleſs; they that came lateſt, being ſcarce able to ſpeak ſo much as to tell that one of their Number *James Blair*, was left dead.

Two Men who were no Colliers offered ſoon after to go down, and others, animated by their Example, accompanied them, and brought up the poor Man by Head, Shoulders, Legs, or Arms. Their Hurry was ſo great, they did not think how they carried him. When he came to the Mouth of the Pit, which was between half an Hour and three Quarters after he had been left in the Bottom of it, two had him by the Arms, and two by the Feet, with his Back upmoſt. I made them immediately ſet him down at a little Diſtance from the Pit, turning him ſupine. The Colour of the Skin of his Body was natural, except where it was covered with Coal-duſt; his Eyes were ſtaring open, and his

Mouth was gaping wide; his Skin was cold; there was not the leaſt Pulſe in either Heart or Arteries, and not the leaſt Breathing could be obſerved: So that he was in all Appearance dead. I applied my Mouth cloſe to his, and blowed my Breath as ſtrong as I could; but having neglected to ſtop his Noſtrils, all the Air came out at them: Wherefore taking hold of them with one Hand and holding my other on his Breaſt at the left Pap, I blew again my Breath as ſtrong as I could, raiſing his Cheſt fully with it; and immediately I felt ſix or ſeven very quick Beats of the Heart; his *Thorax* continued to play, and the Pulſe was felt ſoon after in the Arteries. I then opened a Vein in his Arm; which, after giving a ſmall Jet, ſent out the Blood in Drops only, for a Quarter of an Hour, and then he bled freely. In the mean time I cauſed him to be pulled, puſhed and rubbed, to aſſiſt the Motion of his Blood as much as I could, waſhed his Face and Temples with Water, and rubbed *Sal-volatile* on his Noſe and Lips. Tho' the Lungs continued to play, after I had firſt ſet them in Motion; yet, for more than half an Hour, it was only as a Pair of Bellows would have done, that is, he did not ſo much as grone, and his Eyes and Mouth remained both open.

After about an Hour he began to yawn, and to move his Eye-lids, Hands and Feet. I then put Water, in which I had dropt ſome *Sal volatile*, into his Mouth, which he ſwallowed; and cauſed him to be carried into a Houſe hard by, where I ſet him in a Chair reclining backward. In an Hour more he came pretty well to his Senſes, and could take Drink; but knew nothing of all

all that had happened after his lying down at the Foot of the Ladders, till his awaking, as it were, in the Houſe.

Within four Hours he walked home, and in as many Days returned to his Work; but complained for a Week or two of a violent Pain in his Back; which I believe was owing to the Way of carrying him up out of the Pit.

Lady *Schaw*, Mr. *Bruce* of *Kennet*, and the Reverend Mr. *Thomas Turner*, and ſeveral other Gentlemen, with three or four hundred People of the Neighbourhood, were Witneſſes to what I have now related.

LVI. *Extravaſated Blood in the* Pericardium; *by Dr.* CHARLES ALSTON, *Profeſſor of* Botany *and* Materia medica *in the Univerſity of* Edinburgh.

A Tall robuſt Man, about thirty eight Years of Age, ſober, regular, and delighting much in reading, who had enjoyed a good State of Health all his Life, unleſs being eaſily put into a Sweat by Exerciſe, and having rather a frequent than full Reſpiration, be eſteemed Faults in his Conſtitution, catched cold about the End of *Auguſt* 1734, and had a mild Cough; for which he took Sugar-candy, and ſuch like Family-pectorals.

Sept. 12th, He was ſeized with violent Pain in one of his Kidneys, Sickneſs, and retching to vomit; his Urine in ſmall Quantity, and high-coloured. I ordered him to be blooded, to take a Clyſter with Turpentine, the liberal Uſe of the

Decoctum ad nephriticos, and an Opiate at Night. He neglected the blooding, but took the other Medicines; was ſoon free of the Pain, and never after had any nephritic Symptom.

The Cough continuing, he took *Sperma ceti*, and a Vomit. Finding no Advantage from theſe, he again aſked my Advice. I ordered ten Ounces of Blood to be let, and a pectoral Electuary. Two Days after he had a Vomit with a Paregorick at Night. Next Day his Shoulders were bliſtered, and the Electuary was continued. The following Day he took a Doſe of Rhubarb; after which I ordered *Scillitic Pills* to be taken thrice a Day. By the Uſe of theſe Medicines his Cough became much eaſier; and he went abroad.

He followed his ordinary Buſineſs from the Beginning of *October* to the 6th of *January*; during which Time he did not ſleep as he uſed to do, his Appetite for Food was little, he was pale, had a Weight on his Spirits, was put into Sweat more eaſily than ordinary, ſeemed to force a Cough to free himſelf of ſome Oppreſſion on his Breaſt. Every Morning he brought up by coughing a whitiſh Defluxion, which he compared to Water-gruel. His Urine was ſometimes plentiful, at other times ſcanty; his Pulſe and Reſpiration were pretty natural, being always rather frequent than full.

In *December*, when he was eaſier than at any other Time of this Period, there was an obſervable whizzing Noiſe to be heard in his Breaſt after a full Exſpiration.

I did not viſit him regularly, but ſaw him frequently during theſe three Months, and preſcribed for him as the Symptoms were urgent. The

Medicines

Medicines had ſo little Effect in changing his Diſeaſe to better or worſe, that it is needleſs to be particular either as to their Form or Time of giving. I ſhall therefore only take notice of his being twice blooded, thrice vomited, and as often purged, and having uſed aperient, diuretic Decoctions, Bitters, pectoral Gums and Squills. He kept a low Diet, and ſometimes rode on Horſeback.

January 7. 1735. He was alarmed with coughing Blood among his Defluxion, and ſent for me. There were only a few ſmall Strains of the Blood among a great deal of viſcid Matter; but his Pulſe was more frequent and full than it had been during the Diſeaſe, and his other Symptoms were increaſed. I cauſed him to be let Blood, put him on a Milk-diet, and gave him ſome *Trochiſci de terra Japonica.* His Pulſe becoming weaker, though more frequent, daily, and the Oppreſſion increaſing, a veſicatory Plaiſter was applied to his Back on the 13th. Next Day Dr. *Porterfield* and Mr. *Monro* viſited him with me; and two Days after Dr. *Francis Pringle* was joined to us. We gave the Patient a Variety of Medicines ſuited to the Indications we had; but without any Succeſs, his Pulſe becoming gradually weaker, but its Quickneſs and the Oppreſſion at his Breaſt increaſing. He complained of no Palpitation at his Heart, his Pulſe did not intermit, and he was not faint.

In the Morning of the 21ſt of *January* his Pulſe could not be felt; yet he put on his Cloaths, and ſat in a Chair till Five o' Clock Afternoon; when, complaining of Pain and Coldneſs in his Legs, he bathed them in warm Wa-

ter, and, turning drowſy, went to Bed; where he fell into a calm ſoft Sleep; in which he expired about Eight in the Evening, without a Groan or Shivering.

He had frequently deſired that his Breaſt might be opened after his Death; which was done by Mr. *Adam Lindſay* his Surgeon-Apothecary, while Mr. *Monro* and I, with ſeveral young Gentlemen Students in Phyſick, were preſent.

The Corpſe was fair, plump, and well made; the Lungs were contracted more than ordinary, and in ſeveral Parts adhered to the *Pleura* on both Sides. Both Cavities of the *Thorax* contained a good deal of Water. The *Pericardium* was of a monſtrous Size. After the Water of the *Thorax* was all taken out with Spunges, the *Pericardium* being opened, three full Mutchkins (ſome more than three Pounds) of coagulated Blood and bloody Serum were taken out of it. When the internal Surface of the *Pericardium*, and the external Surface of the Heart were made dry with Spunges, we could diſcover no Aperture in any of the large Veſſels; but upon preſſing the Heart, a bloody Serum ouzed out from a great many ſmall Orifices on its Surface, and principally near its Baſis. The Heart, and its large Veſſels being then laid open, ſome polypous Concretions were found in the pulmonary Artery, and in the Aorta; but ſo ſmall, and of ſuch a tender Subſtance, that we judged them to have been formed ſoon before his Death.

LVII. *A* Phthisis *cured after coughing a Bone*; *by Mr.* THOMAS ARNOT, *Surgeon in* Cowpar.

DAVID HEDDERWICK, a Shoemaker of this Place, a strong healthy Man, thirty Years of Age, began, on the 28th *April* 1733, to complain of Difficulty of breathing, Cough, want of Appetite, and a Straitness or Lump about the upper Part of the *Sternum*, and was at the same time feverish; which Symptoms were increased by his wading in a River with Fishers. He was blooded and vomited; the Sensation of the Lump went away, but the other Symptoms remained; and he had Stitches in his Sides, his Flesh and Strength decaying.

I was called to him on the 23d *May*. His Symptoms were what I have just now related, with a whizzing sometimes in breathing, and a hectic Pulse. His Wife telling me that his Breath often had a very bad Smell, I let twenty Ounces of Blood, which was very sizy. Next Day I gave him a Vomit, and then made him continue the Use of Balsamics and Pectorals; which made his Cough and Breathing easier, and his Breath less fetid; but the Fever, Thirst, *&c.* still continued.

On the 28th *May* all his Complaints increased, and I was obliged to blood him twice more, which made his Stitches milder; otherwise his Symptoms continued; and he had great Pain at the Pit of his Stomach when he coughed. I continued the Pectorals, and repeated the Vomit with the Addition of some *Acet. scillit.* but though his Breath was less fetid, he became worse,

worſe, was confined to his Bed, and was delirious.

June 2d, He had a large Sweat without Relief.

June 3d, The Cough was very violent from Six to Nine o' Clock; when, in a ſevere Fit of Coughing, he threw up the Bone herewith ſent. You ſee it is about the Size of a Hazel-nut, and very ſpungy. It was covered with a bloody Stuff, and was very fetid. Immediately after this Bone, he brought up a large Spoonful of very fetid *Pus* mixed with Blood. His Symptoms immediately became all milder; only his Stomach was weak, and he nauſeated Food ſome Days; for which I gave him a Vomit, which purged as well as vomited him. After this he recovered daily, and is perfectly well.

Where this Bone came from, which plainly appears to have been the Cauſe of all my Patient ſuffered, I cannot tell. I ſuſpected he had ſwallowed it, and that it had lodged ſomewhere in the *Oeſophagus*. His Wife ſaid he had ate ſome ſtewed Veal two Days before he felt the Lump at the upper Part of the *Sternum*. But this I muſt leave to better Judges to determine.

LVIII. *An Ulcer of the Lungs, with* Hydrops pectoris *by Dr.* THOMAS SIMSON, CHANDOS's *Profeſſor of Medicine in the Univerſity of* St. Andrew's.

THere is nothing which modern Phyſicians have truſted more in their explaining Diſeaſes, than the Appearances found in deceas'd Bodies opened after Death; And what ſhould give

give greater Satisfaction than with our eyes to view the Seat of the Diſeaſe? But, if we examine the Accounts given of ſuch Bodies, we ſhall find that the Bulk of them have been made ſo indiſtinctly, and with ſo little Judgment, that they have rather confuſed us in the Inveſtigation of the Cauſes of Diſeaſes, than cleared the Way to us.

There is no Anatomiſt who has had Opportunity of opening any Number of Perſons carried off without a manifeſt Diſeaſe, but who muſt have had convincing Proofs, that there are great Numbers of preternatural Appearances in the Body which give no ſenſible Diſturbances. How many Glands do we find every Day ſchirrous, of which the Patient made no Complaint? What Diverſity find we in the Blood-veſſels, without any Difference, as far as we could obſerve, in the Actions of the Perſons? How oft find we the Gall-bladder filled with Stones without any Diſturbance? Nay, how oft has the Kidney been found loaded with Stones, and greatly changed, while no Complaints had taken place that could manifeſt it? What Child wants Worms? and how few have the eſtabliſhed Signs of them?

One who would inveſtigate Diſeaſes among the Dead, ſhould have a large Hiſtory before him of what the Living can bear without Diſturbance. If this had been always the Qualifications of our Diſſectors, in what different Light ſhould our Hiſtories of diſeaſed Bodies appear? and what an Abridgment ſhould we have had of *Bonetus*'s Works? And, in conſequence of this, Phyſicians ſhould not have been ſo far miſled in advancing the Cauſes of Diſeaſes, and of the Death of their Patients,

Patients, as to have placed every Irregularity found, as the original of the Symptoms he had obſerved in Life. A cautious Theoriſt can never be ſatisfied in his Inquiries till he has found out the Diſorder, whence he can deduce all the Symptoms that had appeared to him by eaſy and natural Conſequences. A Diſorder that he obſerves upon Diſſection, that has no apparent Connexion with the apparent Diſorder that happened in the Actions of his Patient, muſt be paſſed by him as foreign to his Inquiry; or is only to be left on record, to ſee if others may afterwards find the Connexion; but till then, ſuch a Diſorder can never juſtly be advanced as the Cauſe of any particular Diſeaſe. I have opened a Woman whoſe *Ovarium* filled the whole *Abdomen*, and forced up the *Diaphragm* to the third Rib from the Clavicle; and yet, for all this Encroachment upon the Breaſt, ſhe breathed eaſy, and always lay horizontal: So that ſuch a Diminution of the Seat of the Lungs by itſelf, does not cauſe the worſt breathing; nor does the growing of the Lungs to the *Pleura*, many Inſtances being found of that where no Alteration in the Actions of the Breaſt appeared. Yet what ſmall Degree of the *Anaſarca* quite deſtroys the Actions of the Lungs? and how ſmall an Ulcer there melts down the whole Body? By Hiſtories at the ſame time, it would appear, that the Body could be ſupported till the whole Lungs were almoſt conſumed with Suppuration, or be ſpread over with Bags of purulent Matter. Such Inſtances ſhould make us very accurate in tracing where the Force of a Diſeaſe lies.

The

The learned Dr. *Freind* * has a particular Account of an univerſal Suppuration in the Lungs, and reckons that it might proceed from a general Suppuration of the Glands of the *Bronchi*, formerly inviſible. But this does not at all ſeem probable to me, the Glands being Parts not apt to ſuppurate, and the very Glands themſelves being only ſuppoſed. I am apt therefore to ſuſpect, that the Structure of the Lungs has been the Cauſe of this Error in this Caſe, having found that one ſimple Ulcer is apt to raiſe ſuch an Appearance; of which I hope to ſatisfy the diligent Inquirer by the following Hiſtory.

A young man, who had happily got over the firſt Appearances of a Conſumption, was again, after ſome Years, ſeized with the ſame Symptoms, and died ſuddenly in an aſthmatic Fit, after ſpitting purulent Matter in great Quantities for ſome time. The Quantity of the Matter he had been ſpitting, and a Weight he complained of for ſome time upon the right ſide of his Breaſt, made me ſuppoſe, that his being ſtifled ſuddenly with a violent aſthmatic Fit, was owing to a Collection of purulent Matter in the Cavity of the Cheſt; but, upon opening him, I found it was Water that had gradually accumulated there, having found, in the affected Side, near four Pounds.

The thickeſt and upper Part of the Lungs in this Side appeared knobby and ſchirrous; in one Part of which I found a *Sinus* which could have received my Finger; in another Part there was a ſolid Hardneſs of ſome Inches, in the Middle of which lay a long ſtony Subſtance, like a Twig

* *Emmenalogia* Chap. 10.

Twig of white Coral. This I took to be the Effect of the firſt Fit of the Diſeaſe he had recovered of, as the *Sinus* was that of the preſent, and which had ſupplied the Matter he had ſpit in great Quantity.

Finding the right ſide ſo diſeaſed, I had the Curioſity to ſlit through the thickeſt and moſt bulging Part of the Lungs in the left Side. Tho' here they appeared of a good Colour, and no way unequal or hard, I was exceedingly ſurpriſed to find at every Straw-breadth of the Slit a Drop of purulent Matter riſe, as from a diſtinct Receptacle; till thinking with myſelf of the Structure of the Lungs, that they were nothing but a Cluſter of Veſicles from the Extremities of the capillary Branches of the *Bronchi*, which of neceſſity would be filled with the Matter riſing from the *Sinus* by the Force of the Cough, but not carried up all the Length of the *Trachea*, the common Trunk of all the *Bronchi*, and then falling back again, while at other times all or ſome Part of it was ſpit up; as by this Conſideration I found how from one Ulcer the whole veſicular Subſtance of the Lungs could be filled with *Pus* on both Sides, ſo I found that the Appearances would often make it paſs, that the Lungs were univerſally ſuppurated when one Place only was affected. The ſame Conſideration made me ſee what different kinds of Matter under ſuch a Diſeaſe would come from the *Bronchi*, according as it got more or leſs Time to reſt in them; and as they originally were ſupplied with ſerous Humours from *Catarrhs*, *&c.* or with *Pus* from an Ulcer; and pointed out one great Advantage of Succuſſion in riding, by which the

Bronchi

Bronchi were freed of their different *Colluvies*, which of Neceſſity greatly impedes the Circulation through the Lungs. Such thick Liquor, when left long undiſturbed, may become ſolid, and take the Form of Blood-veſſels; which, as *Ruyſch* juſtly obſerves, has made ſome of the moſt diligent Obſervators give us Hiſtories of Cluſters of Veſſels of great Bulk being at once rejected by coughing; whereas in Fact it was only Matter inſpiſſated and moulded in the Lungs. But to return, I reckon the opening of this Perſon lets us ſee fully into his State under his different Circumſtances. It lets us ſee, firſt, that an Ulcer had formerly cured in him; but with it Part of the Lungs was loſt: Then we found what a Load one Ulcer had brought upon the Lungs; and that in this diſeaſed State, wherein the abſorbing Power of the Lungs and *Pleura* was loſt, or overcome by too great a Flow of Water, perhaps from ſome burſt Lymphatic, ſudden Death happened under the Appearance of an *aſthmatic* Fit, while as yet the Perſon was not at all hectic.

LIX. *Remarks on the* Hydrops pectoris, Aſthma, *and hydropical Tumors of the* Abdomen; *by Dr.* Thomas Simson, *Profeſſor of Medicine in the Univerſity of* St. Andrew's.

While Water in the Cavity of the *Thorax* is in ſmall Quantity, I reckon the Diſeaſe cannot be eaſily diſcovered; but when it is in ſuch Quantity as was found in the preceding Hiſtory, we may know the Diſeaſe not

only from the Weight and Fluctuation it cauſes upon the Side affected, but from a Bulge it makes there croſs the Breaſt all along where the Diaphragm is inſerted, whence it ſpreads more or leſs to each Hand according to the Time it continues; as I ſaw in another Patient lately, who died phthiſical and aſthmatic, and who, when opened, had much the ſame Quantity of Water in the left Side of the Cheſt, as the Perſon in the above Hiſtory; of which I was ſo much perſuaded, that before his Death I had propoſed to have made the Operation for the *Empyema*; but his ſudden Death prevented me.

Hoffman (Frederick) in his Account of great Quantities of purulent Matter in the Breaſt, ſays, *Si ingens puris quantitas, ad plures ſæpius libras, in thoracis cavo fluctuat, tumor in latere affecto circa dorſum ſatis manifeſtus, à ſcapulis uſque ad ilia ſæpe prominet (a)*. How ſuch a Swelling as this ſhould directly ariſe from fluctuating Matter in the Breaſt, I cannot perceive. I myſelf have often ſeen it under Diſeaſes of the Breaſt; but then there was always ſomething of an *Anaſarca* along with it; in which Caſe I was ſenſible there would be ſomething more of a Fulneſs obſervable alongſt the Back, from the Patient's being confined to a ſitting Poſture, from the Aſthma which generally attends the *Anaſarca*; under which Circumſtances I have a phthiſical Patient at preſent, who theſe three Months has never ſlept but in a ſitting Poſture, leaning back upon Pillows. When he ſat up much through the Day, his Legs were exceeding ſwelled, and the poſterior and inferior Parts of his Thighs,

(b) Syſtematis, Tom. 3. Sect. 1. Chap. vii. § xix.

Thighs, (where the Water naturally runs, and is much dammed up from the Angle made there with his Legs), as likewiſe over his Back from the Angle made by the Thighs, but being obliged to keep his Bed ſome Days for his Legs, the Swelling left them and the Thighs, but was conſpicuous along the Back, equally on both Sides; whereas the Swelling I ſpeak of runs croſs the Side affected, from the under Point of the *Sternum* to the laſt *Vertebra* of the Back, to a conſiderable Breadth, ſo as to appear a very conſiderable Bulge, and ſomewhat œdematous.

I find in ſuch Caſes as have a great deal of extravaſated Matter in the Breaſt, *Le Dran* reckons that the whole diſeaſed Side of the Breaſt is affected with this Swelling (*b*); and I muſt own I have ſeen it ſpread to a great Diſtance: But in all the Caſes of this Nature which I have ſeen, the Bulge was at the Place I have marked out, and the Swelling turned leſs as it ſpread to each Side. Nevertheleſs it would appear that Water ſometimes gathers within the Breaſt to a very great Quantity, without any external Appearance or Swelling; of which *Hoffman* has a very remarkable Inſtance, in which the Water had accumulated to at leaſt eight Pounds; but then it was contained in Bags, which certainly kept it from bearing ſo much upon the *Diaphragm* (*c*), whence ariſes the Bulge I reckon the Sign of extravaſated Humors. But I would ſuſpect ſuch a Quantity as *Hoffman* ſpeaks of, could ſcarce lodge in the Breaſt, without ſome external Appearance; though expreſsly he ſays, *Nihil*

 tumoris,

(*b*) Obſervat. tom. 1. obſerv. 31. reflect.
(*c*) F. Hoffman. Syſt. Vol. 3. cap. 7. § 25.

tumoris, nihil ruboris exterius in thoracis regione animadvertebatur. But as he tells us, that his Patient was ſwelled both in Legs and Teſticles, I would ſuſpect that the Tumors in the Breaſt had ſome Correſpondence with them, and had ſent ſome of their Water thither; as they do in moſt Caſes, as I ſhall have Occaſion afterwards to remark.

While I am ſpeaking of theſe Swellings about the Confines of the Breaſt and Abdomen, for our Aſſiſtance in the Inveſtigation of Diſeaſes, I muſt take notice of another I have often met with in Perſons whoſe Belly was much diſtended, particularly in the *Aſcites*, covering one half of the *Sternum*, its Cartilage, and ſome Inches below. This raiſed Part looks more tranſparent than the Parts about, and preſſing its middle with your Fingers, you find a great Vacancy between the Skin and the *Sternum* or Cartilage; it is elaſtic, and ſtretched like a Drum-head. I became ſo perſuaded of ſome kind of Matter being lodged here in a young hydropic Girl, that after the Application of a Cauſtic, I cut through the Skin, but nothing appeared; after this I put in my Probe parallel to the *Sternum*, and without any Reſiſtance, carried it round below the Skin, its whole Length; ſo that this elevated Place was a *Vacuum*, only a little Air paſſed upon the opening it.

The Reaſon of this *Phænomenon* I reckon to be the Diſtenſion of the Abdomen much beyond the Level of the Breaſt; by which the Skin, common to both Parts, is gradually raiſed from the *Sternum* that riſes not with the Abdomen.

I have found this Place in old Dropſies filled with Water,

Water, and thence extending itſelf ſo far down the Abdomen, as to reach the Part where we perform the *Paracenteſis*; which, in one Inſtance, when performing that Operation, occaſioned a great Surprize to me: For, after I had drawn a Quantity of muddy Water, without altering the Poſture of the *Trois-cart*, I happened to draw it back a little, upon which I had four Pounds pure Water. In this Perſon, before I performed the Operation, I felt very diſtinctly a great Diſtance between the Skin and Muſcles of the Abdomen, which gave little Reſiſtance to the Touch; ſo that in this there was two Kinds of Dropſies, one in the Cavity, and another between the Muſcles and Skin. Thus much for Tumors along the external Surface of the Breaſt and Abdomen.

Before I end my Letter, I muſt take notice to you, that I have found a ſmall Degree of an *Anaſarca* attended with a much greater Breathleſſneſs than the greateſt Swellings of the *Aſcites*; ſo that when I find a ſudden aſthmatic Fit attack a Perſon, without any other viſible Cauſe, if I find the leaſt Fullneſs of Face or Ancles, I make no doubt to fix upon this as the Cauſe, and I form my Indication of Cure accordingly; eſpecially if I find alongſt with it a Pulſe ſuppreſs'd, ſo as ſcarce to be felt. A Lady who came under my Management, after being bled and frequently vomited, and uſing ſeveral Anti-aſthmatics, had a Thickneſs of her Face; which made me to examine her Ancles; and they bearing the Impreſſion of my Finger a very little, ſhewed me the firſt Degrees of the *Anaſarca*; in which Caſe I never doubt of the

cellular Subſtance of the Lungs being leſs or more affected the ſame Way, and ſo compreſſing more or leſs the Extremities of the *Bronchi* between which they ly; and ſo ſtopping the whole Circulation, which few other Cauſes of an *Aſthma* can do; a general Spaſm, the *Bronchi* univerſally filled with Matter, or Water or Matter in the two Cavities of the Cheſt, being the other Cauſes we can ſuſpect for it; between which there are Signs ſufficient to diſtinguiſh which of the Species take place. In my Patient, I became ſo poſitive about the Cauſe, that I doubted not that very Night, when every body looked upon her as dying, and her pulſe was ſcarce to be felt, to give her ten Grains of *Sweet Mercury*; by which her Breath and Pulſe was reſtored in the Morning, after purging two or three times; and repeating it twice or thrice, at the Diſtance of a few Days, quite recovered her of both Swelling and *Aſthma*; the firſt of which was ſo ſmall as to require a diligent Attention to be ſenſible of it. And thus, by an anatomical Conſideration, I was directed to the Cure of my Patient; as I am in many other Caſes, when doubting which Method of a great many in vogue to follow.

As Diureticks and Quick-ſilver have been famed for their Service in the *Aſthma*, have we not Reaſon to ſuſpect that an *Anaſarca*, ſo obſequious to theſe Remedies, is often the Foundation of the *Aſthma*?

LX. *A Phthiſis, occaſioned by a Tumor under the left* Scapula; *by Dr.* CHARLES AYTON-DOUGLAS, *Phyſician in* Fife.

ABOUT two Years ago I was called to ——— *Roger* Son to ——— *Roger*, Farmer in *Strathdie*, who ſhewed me a Tumor under his left *Scapula*, which he ſaid was as large as a Penny-loaf before he hurt it, but when he ſhewed it to me, it was the one half leſs. It ſeemed to be contained in a Bag immediately below the Teguments. He ſaid that it had continued two Years, but that it had not been painful until about a Month before, when he accidentally hurt it; upon which it became painful, and he was ſeized with a violent Cough, which moleſted him Night and Day. He ſpit up a great Deal of yellow, thin, ſtinking *Pus*, mixed with ſome Blood. His Pulſe was very frequent and hard; he had a great Heat over all his Body; he was much extenuated, and his Appetite was very bad. He added, that before he hurt the Tumor, it did not give him much Uneaſineſs: That his Appetite was pretty good, and that he had Strength enough for working the hardeſt Country-work; and, upon my inquiring narrowly, he recollected that he had had a pretty ſevere Fever and a Cough, and a Stitch in the Place where the Tumor formed, a little before the Tumor began.

I imagined my Patient would die very ſoon if I opened the Tumor, by the large Diſcharge and collapſing of the Lungs; and therefore adviſed him to be very regular in his Diet, and

uſe

uſe nothing for Food but *Hippocrates*'s Ptiſan which is much commended by its illuſtrious Author, or Oats well huſked and prepared in the ſame Manner, or Rice as long boiled as *Hippocrates*'s Ptiſan, Cow-milk with the natural Heat, or Butter-milk: I alſo ordered him to take every Morning, and at four in the Afternoon, two or three Tea-cupfuls of the Infuſion of *fol. & florum tuſſilaginis, fol. capil. veneris & urticæ*, and the following Pills, ℞ *Terebinth. Venet. unc. ſem. Glycyrhiz. pulv. q. ſ. ut fit maſſa pilulis formandis idonea, capiatur una gr.* iv. *omni quadri horio.*

He continued under this Regimen for a Fortnight, and the *Tumor* was conſiderably leſſened, and all the Symptoms became milder. However, he was ſtill hectic, with a bad Cough, and I had little Hope of ſubduing ſo obſtinate a Diſeaſe by any Method; but I recollected, that the antient *Greek* (*a*) and modern *Ægyptian* (*b*) Phyſicians ſeem to depend much on Iſſues put in with an actual Cautery betwixt the Ribs in a dependent Place, in any Suppuration of the Lungs or *Pleura*, even in an *Empyema*, Inflammation of the Lungs, and an *Aſthma*. That the Inuſtions mentioned by theſe Authors were Iſſues, is pretty plain; for they order the Eſchars to be ſeparated, and the Ulcers to be kept open until the Recovery of the Patient. And being of the Opinion that one *Seton* is equivalent to ſeveral Iſſues, I ordered one to be put in parallel to the Ribs, and betwixt two of them that were immediately

(*a*) Hippocrat. Aphoriſ. lib. vii. & de morbis, lib. 2. & 3. Galen. lib. vii. comment. in Aphor.

(*b*) Vide Proſper. Alpin. de medicina Ægyptiorum.

mediately under the most dependent Part of the Tumor; but the Tumor itself was not pierced. The good Effects of this were beyond my Expectation; for within eight Days after it was put in, the hectic Fever went quite off, his Cough was considerably easier, and the *Pus* that he spit up became of a better Colour and Consistence, and that which was evacuated plentifully by the *Seton* was pretty good, and turned gradually better. He recovered his Flesh and Strength by quicker Degrees than one could have expected; and in a little Time the Bag under the *Scapula* that contained the Matter, was quite emptied. Some Days after this he was able to sit on a Horse, and I advised him to ride, especially in the Forenoon, and to use that Exercise as much as he could, without fatiguing himself, and to continue the Regimen already mentioned, except the Pills, of which he got no more than the Quantity that I wrote for at first.

An uncommon Symptom happened about the Time that the Matter was all evacuated from the Bag; for whenever he chanced to be seized with a Fit of Coughing, the Air was forcibly driven from his Lungs into the Bag in which the Matter had been lodged, and distended it to about the Bigness of an *English* Quart-bottle; and when the Fit of Coughing was over, the Air was gradually forced back again into the *Thorax*. All his Friends and Neighbours were much surprised at this Symptom; for which I prescribed nothing but a Compress and Bandage moderately tight, and the same Regimen as formerly. The Sides of the Bag were gradually

conso-

conſolidated from the Circumference to the Center; and the laſt Time that I obſerved any Air forced into it, it was not diſtended to above the Bigneſs of a Pigeon's Egg. In ſhort, within five Weeks after the Air was obſerved to come into the Bag, it was quite agglutinated and healed; and, about two Weeks after that, the *Seton* was taken out; and by that Time he had fully recovered his Appetite, Vigour and Fleſh, and has continued in a firm State of Health ever ſince.

From this Hiſtory, and from the Caſe I ſent you lately of a Boy made firſt apoplectic, and then ſtupid, by a Fall (*See Art.* LII.); and indeed from the good Effects of Iſſues and *Setons* in many Caſes, it would appear, that obſtructing or heterogeneous Matter in the Blood flows much by ſuch Drains. Is it not reaſonable then to make trial of *Setons* in dangerous Diſeaſes, ſuch as *nervous Fevers*, where the Head is much affected, *Pleuriſies*, *Peripneumonies*, &c. ſince for certain they cannot do any Harm?

Since writing theſe two Caſes, I have cauſed *Setons* to be put into Patients in very dangerous Fevers, where the Head was much affected, with remarkable Succeſs.

LXI. *An uncommon Convulſion of the Trunk of the Body cured*; *by Mr.* THOMAS ARNOT, *Surgeon in* Cowpar.

A Boy paſt eight Years old, had laboured ſix Weeks under violent Pain of his Belly, which was not conſtant, but attacked him from time

time to time, and had taken Medicines againſt Worms, and ſome others, without any Relief, when my Advice was aſked for him. While I was with him, the Pain ſeizing him, I laid my Hand on his Belly, and felt the abdominal Muſcles of the right Side ſtrongly contracted; and ſoon after he was thrown a Yard forward on the Floor, all his Body being drawn together. This put me on examining the Appearances of theſe Convulſions. He was taken with them almoſt every Quarter of an Hour of the Day, but was free of them in the Night: They began with the Senſe of Pain in his Belly; then he was thrown by the convulſive Contraction from his Seat on the Floor, as already deſcribed, his Arms and Legs being ſeized alſo with the ſame Contractions. He became inſenſible, but did not foam at the Mouth, or void Urine or *Fæces*; nor were his Hands or Fingers contracted, though his whole Body was violently bended by the Convulſion. When the Fit was over, he underſtood every thing, being reſtored to his Senſes; but complained of being all pained and feeble.

I gave him a Vomit of *Ipecacuan*, and applied a bliſtering Plaiſter on his Shoulders; then he got the following Infuſion and Pills. ℞ *Rad. Pæon. drach.* vi. *Hellebor. nigr. Jalap. a. drach.* iii. *Valerian. ſilv. unc* i. *Caſuminar. dr.* i. *Cort. cinamon. ſcrup.* ii. *fol. ſenn. dr.* vi. *Rut. Roriſmarin. flor. Lavend. a. M.* i. *Sem. Aniſ. Carv. Fœnicul. d. a. dr.* ii. *M. inciſ. & contuſ. affund. Vin. alb. lib.* i. *ſem. Sp. Lavend. comp. dr.* i. *Aq. Pæon. comp. Rut. a. drach.* ii. *M. poſt biduum coletur.*

℞. *Gum.*

℞ *Gum. Galban. Aſafœtid. Diagrid. Mercur. dulc. a. ſcrup.* i. *Caſtor. Aloes ſocotrin. a. drach. ſem. ſal. ſuccin. gr.* x. *ol. aniſi, gut.* viii. *Balſam. Peruvian. q. ſ. ut ft. pilul.* xxiv.

Twice a Week he took the Pills at Bed-time, and next Morning ſwallowed two Spoonfuls of the Infuſion when he awaked, and as much at eleven o'Clock in the Forenoon. At Night after the Operation of the Phyſic, he took a Spoonful of the following Mixture: ℞ *Aq. Pæon. Theriac. Sp. Lavend. compt. a. unc.* i. *Aq. Rut. unc.* ii. *Cinam. fort. Ceras nigr. Tinct. Caſtor. a. unc. ſem. Syrup. ex extract. papav. alb. unc.* iv. *M.*

In the Days free from the Purgative, he took a Doſe thrice a Day of the following Powders: ℞ *Myrrh. Caſtor. Succin. alb. ppt. C. C. C. Coralin. Cinab. nativ. a. drach.* i. *Mercur alcalizat. Sacchar. cryſtal. alb. pulv. Rad. Pæon. a. drach.* ii. *Valerian. ſilv. drach.* iii. *ol. aniſ. gut.* x. *M. ft. Pulv. cujus ſint ſcrup.* ii. *p. doſi.*

After he had taken theſe Medicines ſome Days, with little Benefit, I applied the following Plaiſter to his Belly: ℞ *Empl. Hyſteric. Diachyl. cum Gumm. a. unc. ſem. Oxycroc. Gum. Aſafœtid. Terebinth. Venet. a. drach.* ii. *extract. papav. alb. unc. ſem. ol. ſuccin. cariophyl. a. gut.* x. *Pulv. ſem. cymin. drach.* ii. *M. extend. ad alutam.* This Plaiſter had not been applied two Days, when his Fits went quite off, except that one of them came for three Days exactly at five o'Clock in the Evening; after which, for ſix Days he had only a Yawning at that Hour, which gradually decreaſed, till after the Uſe of the Medicines a few Weeks, he was altogether free,

free, and ſoon recovered his Fleſh and Strength, which had been greatly impaired by the Diſeaſe, of which he has had no Return.

I cannot help thinking, that the *Extract of the Poppies* in the Plaiſter contributed greatly to the Cure, by at leaſt giving a Truce from the Diſeaſe, till the other Medicines had Time to rectify the Diſorder in the Nerves.

LXII. *An uncommon Tumor of the Belly and a Dropſy cured; by Mr.* PATRICK MURRAY, *Surgeon in* Earlſton.

ISABEL PARK, about twenty ſix Years of Age, had frequent Suppreſſions of her *Menſes* for eight or nine Years, and Pains in her *Scapula* and right *Iſchium*. Five Years of this Time ſhe was troubled with Pains about the Region of the Liver. Her Appetite was bad, and ſhe had a ſhort dry Cough, with periodical Paroxyſms like thoſe of an intermitting Fever. After which two Tumors appeared under the Baſtard Ribs of the right Side, which gradually increaſed, without changing the Colour of the Skin, till they were as large as Childrens Heads. They were ſoft, yielding ſomewhat to Preſſure; but without any Fluctuation, Pulſation, or Pain in them; but occaſioning very violent Pain along her Side, as far as the Arm-pit; the Baſe, ſo far as could be judged by the Fingers, being within the Muſcles.

She continued in this melancholy Condition ſeventeen or eighteen Months, taking no Medicine, except ſome Drops of *Laudanum*, when the Pain was moſt ſevere.

In the Beginning of *Auguſt* 1732 the two Tumors joined into one, and an evident Fluctuation of Liquor under the Skin was felt: The Swelling was as large as that of Women in the laſt Months of Pregnancy; and the Pain in it was exceedingly violent.

I gave her a gentle Doſe of *Pilulæ ex duobus*, which purged her pretty well; few Days after which ſhe took a violent purging of very viſcid Matter, mixed with a groſs parenchymatous-like Subſtance, pretty near the Conſiſtence of well-wrought Curd, with little or no fetid Smell. She took a *Scruple* of *Pilulæ ex duobus* that Night, and as much next Morning, with four Grains of *Reſin of Jallap*. This Purgative operated nine or ten Times, and brought away great Quantities of that ſort of Stuff.

The two ſucceeding Days ſhe took four Ounces of a bitter chalybeat ſtrengthening Ale twice, then I renewed the purgative Pills; and in this Method of taking the medicated Ale two Days, and the Pills the third Day, I continued for a Month, the Tumor and other Complaints leſſening daily, till in ſix Weeks ſhe ſeemed to be free of all of them, and ſhe lived in a good State of Health three Years.

In the Beginning of *December* 1736, ſhe ſhewed me watery Swellings of her Legs, Thighs and Belly; her Urine was in very ſmall Quantity; her Breathing was ſo difficult, that ſhe was obliged to ſleep in an erect Poſture, being like to ſuffocate when ſhe attempted to ly. She had great Thirſt, and a quick feeble Pulſe.

I gave her three Doſes of the purgative Pills, with ſome *Sal ſuccini* in ſix Days, which did not decreaſe

decreaſe the Swelling. I then made her take four Ounces twice a-day of the following Ale, which I have found of great Service in Dropſies.

℞ *Ciner. Geniſt. angulos trifol. lib.* i.
Limatur. Mart. unc. iv.
Sem. Sinap. unc. ii. *M. infund. in Cerevis. nov. lib.* xii. *poſt biduum cola.*

The firſt Doſe of this Ale brought away full five *Scots* Pints (*lib.* xx.) of Water by Urine. By the alternate Uſe of the purgative Pills every third Day, and of the hydragogue Ale in the intermediate Days, for three Weeks, and of the Pills only once a-week, and of the Ale all the other Days for four Weeks more, with a Prune kept in her Mouth inſtead of Drink, all the Water was drained off, and ſhe was brought to a good State of Health, which ſhe ſtill enjoys.

LXIII. *A* Hydrops Aſcites, *from a Tumor depending from the Navel internally*; *by Mr* WILLIAM JOHNSTON, *Surgeon in* Dumfries.

AGNES SWORD, who had born ſeveral Children, imagined herſelf with Child in the 43d or 44th Year of her Age, and, after going a Year, had violent Pains like thoſe of Labour, for eighteen Hours, having ſome alterative Medicines given her. After this her *Catamenia* returned, and ſhe continued regular eight or nine Months; at the End of which ſhe had a Flooding, which continued five or ſix Minutes, and the *Menſes* returned no more. She had a Fulneſs and Swelling of her Belly from the Time ſhe thought herſelf with Child,

which increaſed greatly, after having her Belly bruiſed in the fifteenth or ſixteenth Month of her Diſeaſe. She continued in a ſickly Way about ſix Years more, and was ſo hydropical in *March* 1738, when ſhe firſt conſulted me, that by the Advice of Dr. *William Cochran* I tapped her, and, in fourteen Months after, I repeated that Operation twelve times; the Quantity of Water which I let out was ſometimes greater, (once 82 *lib.*), at other times leſs; in all it amounted to 716 *lib.*

The eighth Time ſhe was tapped, the Liquor was fetid; in the 9th, 10th, 11th and 12th, or laſt Operation, it was not ſo ſtrong ſmelled, but the ſilver *Canula* was gilded of a bluiſh Colour, when it was taken out of her *Abdomen*; and, after the Evacuation of the Water by the three laſt Operations, I obſerved a heavy Ball fall from the upper Part of the Belly to the *Oſſa pubis*.

On the 27th of *May* 1739 ſhe died. When her Body was opened, a large carnous Excreſcence was found depending from the Navel, by a Neck of about two Inches Diameter. The Excreſcence adhered to ſeveral other Parts of the *Peritonæum*, but ſo weakly, that I eaſily ſeparated it with my Hand, and could ſee no Appearance of any Veſſels, except at the Neck already mentioned.

When I opened the Excreſcence, it appeared all compoſed of Cells, communicating with each other; ſome containing a ſerous Matter, others were full of a Subſtance of the Conſiſtence of Marrow. From theſe Cells, Tubes ſo large as to receive a Gooſe-quill, and full of the ſame

ſort

ſort of Matter as was in the correſponding Cells, went out to the Navel, being contained in a thick muſcular Subſtance, of which the Neck of the Tumor was principally compoſed. This Excreſcence weighed eight Pounds.

Nothing was to be ſeen in the *Viſcera* remarkably deviating from the common Structure.

LXIV. *An* Aſcites *in a pregnant Woman*; *by Mr.* THOMAS LAURIE, *Surgeon in* Selkirk.

A Woman about thirty ſix Years of Age, the Mother of ſix Children, of a good Complexion, and generally healthy, except that ſhe was ſubject to ſome hyſterick Diſorders after Child-bearing, about *November* 1739 perceived a Tumor beginning immediately under the *Coſtæ nothæ*, which ſtretched itſelf gradually forwards and downwards, till paſſing the *Linea alba*, ſome Inches below the *Umbilicus*, it filled the whole *Epigaſtrium*, to the *Cartilago enſiformis*; ſo that her Belly was diſtended to the Bigneſs it uſed to be in her laſt Months with Child. The Tumor was pretty hard to the Touch, but ſhe did not complain much of Pain in it. Several Medicines were given her internally, and ſome external Applications uſed, but to no Purpoſe; it ſtill increaſed.

About the 12th of *Auguſt* 1740, as ſhe was going about her Houſe, ſhe imagined ſomething cracked within her, and the Tumor diſappeared of a ſudden, at leaſt was leſs circumſcribed, being more diffuſed through the *Abdomen*. She immediately fell into fainting and vomiting, and

became feveriſh. She then ſent for me, and told me what had happened. I gave her an opening Ptiſan of *Tamarinds*, *Senna*, *Rhubarb*, &c. which had very good Effects, for it purged her exceeding well for ſeveral Days, and probably, if ſhe had continued to uſe it as directed, the Matter might have been entirely evacuated: But, growing impatient under the frequent Purging, ſhe left off the Ptiſan, and took ſomething binding, without my Knowledge; by which both her Urine and Purging were ſtopt, and her Belly began to ſwell.

When I was called again, I employed all my Care to reſtore theſe Evacuations; but without Succeſs. I then deſired her Huſband to call Dr. *Plummer*, who was then in the Country. He preſcribed ſeveral diuretick and purgative Medicines; which had little Effect as to bringing down the Swelling of her Belly. The Doctor, at his next Viſit, propoſed the *Paracentheſis*, as the moſt certain and expeditious Way of freeing her from that Load of Water which diſtended her Belly. She would not comply with the Propoſal at firſt; but after a Day or two, finding the Swelling ſtill increaſing, ſhe ſubmitted to the Operation; which I performed, in preſence of the Doctor, upon the 13th of *September*; and, by the Help of a good Belt, and gentle Compreſſion, drew off at once eight *Scots* Pints of Water, which was all that could be preſſed out. She behaved with great Firmneſs under the Operation; her Belly fell to its ordinary Size; ſhe was perfectly eaſy, got good Reſt the Night following, and paſt plenty of Urine. In few Days the Diſcharge of Urine ſtopt, and her Belly ſwelled apace; ſo that by the 20th of

Septem-

September it was as big as before the Operation. The Patient urged that ſhe might be tapped again immediately. I declined it till I ſhould acquaint the Doctor, who ſuſpecting that this Diſtenſion might be moſtly occaſioned by Air pent up in the Inteſtines, or Cavity of the *Abdomen*, propoſed carminative and ſtrengthening Medicines; but as he could not have an Opportunity to examine into it, being to return to *Edinburgh* next Day, he directed me to inquire carefully into all the Appearances; and if I was ſatisfied there was a conſiderable Collection of Water, to make a new Puncture. Accordingly on the 22d I drew off other four Pints. She ſoon after paſt Urine with Eaſe, and in good Quantity, and reſted very well that Night. But next Morning ſhe was ſuddenly ſeized with a Trembling, Vomiting, and Suppreſſion of Urine. I then concluded ſhe was gone; for by this Time ſhe was brought very low. She acquainted me, that there had happened to her a *procidentia uteri*, to which I attributed thoſe violent Symptoms which had followed. I directed her Midwife to preſs up the *uterus* gently, and apply an aſtringent Fomentation to the Parts. When the Symptoms were a little abated, I attempted to make ſome Evacuations by ſuch Means as would occaſion the leaſt Diſorder; but notwithſtanding theſe, her Urine was very ſcanty, and her Belly ſwelled. She inſiſted on being tapped a third Time: And although I feared ſhe would not be able to ſtand it out; yet, as ſhe preſſed it much, and had ſhown ſo much Reſolution formerly, on the 2d of *October* I made a Puncture in the oppoſite Side of the *Abdomen*; by which I diſ-

charged

charged four Pints more of Lymph; and, to prevent the *procidentia uteri*, I cauſed the Midwife to apply the ſtrengthening Fomentation pretty conſtantly all next Night. From this Time every thing went well; ſhe daily recovered her Strength and Fleſh, and has ſince brought forth a healthy Child, and ſhe herſelf continued in good Health. By computing from the Birth of the Child, it appears that ſhe had conceived three Months before the *Paracentheſis* was firſt performed; of which ſhe had no Suſpicion herſelf: And notwithſtanding ſhe had taken ſeveral Doſes of *Mercurius dulcis*, and other hydragogue Purges, yet ſhe brought the Child to the full Time.

LXV. *Of the Cure of the* Cholera; *by Dr.* CHARLES AYTON-DOUGLAS, *Phyſician in* Fife.

THE *Cholera*, which is a violent vomiting and purging of Bile and other acrid Humors, being a Diſeaſe ſo acute and deadly, as frequently to deſtroy a Man in the Space of twenty four Hours, when a Phyſician is not to be had, which is frequently the Caſe in the Country; or when a wrong Method of Cure is preſcribed, which I am humbly of opinion *Etmullerus*'s is, who recommends Vomits, Purges, and Sudorificks, which ſeems to be adding Oil to the Flame: I hope therefore my Countrymen will take in good part my publiſhing a Method of curing it by a Medicine which is always at hand, even in the Houſes of the meaneſt Peaſants;

sants; which I have tried often, and never found it fail.

If the Patients be not too much exhausted before I am called, I make them drink heartily of warm Water three or four times, which they always throw up. This dilutes, and so blunts the Acrimony of the Humors, and at the same time evacuates them. Immediately after I advise them to drink plentifully of a Decoction of Oat-bread baked without any Leaven or Yest, carefully toasted as brown as Coffee, but not burnt; which Decoction ought to be of the Colour of Coffee, when it is weak. This Prescription I have always found my Patients most willingly obey, their Thirst being generally very great, and they always affirm that it is most grateful to their Stomachs; and I must add, that I do not remember that any of them ever vomited it. I have always used Oat-bread; but when it cannot be had, I doubt not but Wheat-bread, or Meal well toasted may do.

But when the Patient is much exhausted with violent Evacuations upwards and downwards, the first Thing that I give him, is a large Draught of the above mentioned Decoction; and when the *Nausea* is pretty well settled, I frequently order a Pill of *Opium*, to the Quantity of two thirds of a Grain for an ordinary Person, increasing or diminishing the Dose, according to the Age or Strength of the Patient.

But if the Patient be convulsed, and the extreme Parts cold, and his Pulse weak and intermitting, then it is proper to give a strong Dose of *liquid Laudanum*, because it has its Effect sooner than the *Opium*, such as *gut.* xxv. for an

an ordinary Perſon, in an Ounce of ſtrong Cinnamon Water, and afterwards a Draught of any Wine that is moſt agreeable to the Patient, mixed with an equal Quantity of the Decoction; and they may afterwards take the Decoction to quench their Thirſt; and now and then they may take a little Wine mixed with it, according as they need a Cordial. To prevent a Relapſe, which the Patient is not able to bear, it will be proper to repeat the Opiate in a moderate Quantity for ſome Days, Morning and Evening. And Care muſt be taken not to overload the Stomach, or to eat any thing but what is of good Nouriſhment, and eaſy to digeſt, and grateful to the Stomach.

It may be obſerved, that the above Preſcription is to be uſed when the Patient is quite exhauſted, and in the very Jaws of Death; but in ordinary Caſes, when the Patient is not much exhauſted, and Opiates are not to be had, or if the Patient's Conſtitution diſagrees with them, then the Decoction itſelf may be truſted to.

What engaged me to preſcribe the above Method of Cure to others, was my having tried it on myſelf with Succeſs. A great many Years ago I was extremely ill of a *Cholera*, and the Evacuation upwards and downwards was ſo violent, that in the Space of ſix Hours I was not able to ſtand unſupported; and I vomited *Laudanum* and every other thing that could be thought on: But I longed much for a Draught of the Decoction above mentioned, and I imagined that I would not vomit it, although at the ſame time I loathed violently every other thing that any of my Friends that were about me

me mentioned to me. As soon as a large Quantity of the *Decoction* could be got ready, I drank heartily of it, and it stopped both the vomiting and purging. Two or three Days after that, by being careless about my Diet, and the other Non-naturals, I relapsed, and was immediately again cured by the Decoction of toasted Bread; since which I have cured great Numbers with it.

A Lady of my Acquaintance told me within this Fortnight, that, about eight Days before, she had a severe *Cholera*, in which she vomited every thing that was prescribed for her; but longing as earnestly as Women with Child use to long for any thing, for the Decoction of toasted Oat-bread, she drank several Draughts of it with great Pleasure, and was cured immediately.

A Physician of my Acquaintance, to whom I communicated this Method of Cure, assures me, that the Decoction itself, without any other thing, cured a Patient of his who was brought very low by a *Cholera*, occasioned by a *Salivation*, after he had in vain tried every other thing that he could think on.

This Medicine is not indeed a pompous Composition, and has not in it Emeralds, Pearls, nor oriental Bezoar, recommended by *Doleus* and several other famous Practitioners. But it is not far different from *Celsus*'s Method of Cure: For he *(a)* prescribes in the Beginning vomiting with warm Water, to be repeated frequently; and he says they should smell Pennyroyal dipped in Vinegar, or *Polenta* sprinkled with Wine; and,

a

(a) De re medica, lib. iv. cap. 11.

a little after that, he adviſes the Patient to take Wine and Water mixed with *Polenta*. And *Paulus Ægineta* (*b*) preſcribes vomiting with warm Water, and after that an Opiate.

Polenta is mentioned by ſeveral of the antient *Greeks* and *Romans*, as a Thing generally uſed in their Time. *Pliny* (*c*) ſays, that it differeth from Barley-meal, in ſo far as it is much toaſted or parched; and to that he thinks it owes its aſtringent Quality, being good for the Stomach, and that it ſtops a *Diarrhœa*: And ſeeing it differed from Barley-meal, only in ſo far as it was fryed or very much toaſted, it could be made of nothing but Barley fryed or toaſted brown, and grinded to Powder. And elſewhere (*d*) he deſcribes it to have been made after this manner by both the *Greeks* and *Italians*; but he adds, that they frequently mixed with it a little Lint-ſeed, ſome Salt, and ſome Coriander-ſeed. It is alſo mentioned by *Hippocrates* (*e*). And it is deſcribed by *Paulus Ægineta*, as made of Barley fryed or much toaſted; and he recommends it to be drank mixed with Water for quenching Thirſt (*f*). And it appears from the holy Scriptures to have been uſed by the *Jews*, as antiently as the Reign of King *David* (*g*). From whom, or the *Syrians*, it is probable that the *Greeks* borrowed it; for by their own Confeſſion they were much obliged to the *Syrians* and other Eaſtern Nations for many of their Cuſtoms, as well

(*b*) Lib. iii. cap. 59.
(*c*) Hiſt. Natural. lib. xxii. cap. 25.
(*d*) Lib. xviii. cap. 7.
(*e*) Vid. de Affectionibus.
(*f*) Lib. i. cap. 78.
(*g*) 2 Sam. cap. xvii. ver. 28.

well as for ſome of the politer and more uſeful Arts and Sciences: And ſeeing it was uſually drank mixed with Water, eſpecially with bad Water, to make it wholeſome and well taſted (*b*); it is probable that the *Arabians*, who were Neighbours to the *Syrians*, and inhabited a dry and barren Country, where little Corn was produced, and Coffee-berries grew plentifully with little or no Culture, found it moſt convenient to make their *Polenta* of the Berries, or they might uſe a Decoction of them toaſted, inſtead of the *Polenta* which their Neighbours the *Syrians* mixed with their Water.

LXVI. *Fatty Subſtances voided by Stool, after a violent Strain of the Back*; *by Mr.* THOMAS ARNOT, *Surgeon in* Cowpar *of* Fife.

DAVID THOMSON a Weaver in the Pariſh of *Kettle*, about forty Years of Age, attempting to take up a very heavy Veſſel, felt his Back-bone, immediately above the *Os ſacrum*, make a great Crack, with moſt violent Pain, in that Part and at the ſuperior *Vertebra* of the Loins. He immediately loſt all Power of his Legs, and fell to the Ground, without being able to move out of the Place; and it was with the utmoſt Difficulty that he could allow himſelf to be carried to his Bed. The Pain continuing long very ſevere, he fancied that the Bone was diſlocated inwards; and, to reduce it, made one of his Neighbours pull his Belly backwards, while another, getting on his ſhoulders, preſſed

them

(*b*) Plin. natural. hiſt. lib. xxv. cap. 3.

them downwards and forwards; by which he thought his Loins were much ſtraighter than formerly, and he had leſs Pain.

Some Days after this, a Country Bone-ſetter undertook to put all the Bones right, making one Man pull at his Shoulders, and the other at his Legs, in a contrary Direction. By this Extenſion he was put to moſt exquiſite Torture, and all his Complaints were increaſed.

Three Months after, he began to recover the Power of his Legs ſomewhat, ſo as to crawl out of Doors, and then obſerved among his Excrements a whitiſh Subſtance about the Bulk of a large Walnut, Part of which I have herewith ſent you. It is, you ſee, like Tallow or hardned Marrow, compoſed of ſmall Globules. It melts with Heat. During ſeveral Days after, he obſerved Pieces of the ſame ſort of Subſtance, of the Size of Kidney-beans or Peas, come away among his *Fæces*. He thought all theſe leſſer Pieces, if they had been put together, would have been equal to the large Piece he paſſed firſt.

The Man continues ſtill unable to follow his Buſineſs, and cannot turn the Trunk of his Body to any Side without great Pain.

LXVII. *Hiſtories of the Separation of the villous Coat of the Inteſtines in Diſeaſes, in a Letter to* Alexander Monro, *P. A. from Dr.* Thomas Simson, *Profeſſor of Medicine in the Univerſity of* St. Andrew's.

I Imagine the two following Hiſtories may give ſome Hint when the *villous Coat* of the *Inteſtines*

ſtines is rubbed off, which, in your ingenious Paper upon the *Duodenum*, in the fourth Volume of Eſſays, you obſerved to be a Caſe not ſo eaſy to be inveſtigated; and therefore ſend them to you with a ſhort Comment.

May 20. 1725. A Maker of *Golf-balls*, who had ſuffered long by a *Phthiſis pulmonalis* and *Fiſtula ani*, dying, I was deſired to open him for the Satisfaction of the Friends, though I had not ſeen him under his Illneſs.

The *abdominal Viſcera* ſhewed nothing obſervable, till the Stomach and Inteſtines were laid open. Scarce in them were found one of the Valves or *Rugæ*: nay the pulpy villous Coat was to be met with in very few Places; but plenty of abraded Pieces of Membranes ſcattered up and down in them, in an inflammatory State, looking as if injected; while the nervous Coat appeared both in Stomach and Inteſtines neat and clean no way covered; only at the *Rectum*, and Part of the *Colon* next to it, there were ſeveral gangrenous Stains. The Side of his Breaſt he leaned his Inſtruments upon in beating in the Stuffing of his Balls was much depreſſed through its whole Extent, and the other was thruſt out as much. In the depreſſed Side no Lobes of the Lungs could be diſtinguiſhed, and the Lungs were of as deep a Red and as firm a Subſtance as thoſe of a boiled Fowl, and were quite united to the different Parts ſurrounding them.

I was informed, that he had ate no ſolid Meat for a very long Time, becauſe of the great Uneaſineſs he had in his Stomach, and through his whole Belly, upon taking any thing; and that for the three laſt Weeks he had ſwallowed over

nothing but now and then a Spoonful of Water ſip and ſip, every Gutt that went into his Stomach burning like a Coal, and diſordering his whole Fabrick.

II. A young Woman who in her younger Days was threatned much with a Decay, and for a Dozen of Years was much ſubject to ſlow remitting Fevers, all along had the moſt delicate Stomach one can imagine, nothing but repeated cautious Trials by herſelf being able to determine what Drink ſhe could bear. Zery dropt amongſt Water is what ſhe ventures moſt upon, though the Wine of this kind, which other People give her in Compliment, muſt be cautiouſly tried by herſelf before ſhe can be free in the Uſe of it. Teſtaceous Powders generally gave her Relief under the ill Fits; but the continued Uſe contributed nothing to harden her Stomach againſt new Attacks; a cautious Diet being the only Thing under which ſhe got Reſpite; though often ſhe had Attacks when moſt careful this Way. For the bygone Year ſhe has had frequent Fits of the *Dyſentery* affecting the whole Abdomen, though the *Teneſmus* continued longeſt, and gave her the greateſt Uneaſineſs. Under the firſt Fit, which was the ſevereſt, obſerving that the mucous Stuff ſhe paſſed in great Quantities, lay in Parcels ſomewhat firm and coherent, ſhe had the Curioſity to reſerve ſome of it for my Examination. This I found of different Forms. Some Parts of it one would have reckoned, from Colour, Length, and Shape, to have been a round human Worm bruiſed; but laying it in Water, and ſpreading it, I found it altogether fibrous, or rather va'cular, made up of larger

larger Veſſels parallel one to another, as thick as an Horſe's Hair, between two and two of which ran other Veſſels as big as a human Hair of a reticular Diſpoſition; ſome Lozenges were about the fourth of an Inch in Diameter, but others much larger; all of them were tranſparent and knotty like Lymphaticks. In this Form I ſpread Parcels of it out, between two and three Inches in Breadth, and ſix or ſeven in Length. In ſeveral of them both the larger and the ſmaller Fibres appeared every Way entire, though eaſily broken when handled; in other Parcels the fibrous Part was ſo diſſolved, that they appeared one coagulated Lump like the White of an Egg; though even theſe, when carefully examined, ſhewed more or leſs of the fibrous Part. Several times ſince, in the different Attacks of the Diſeaſe, the ſame mucous Stuff has been examined, and found always of a Piece with what we have deſcribed.

By both theſe Inſtances I reckon it abundantly evident, that the villous Coat is in a very looſe and weakly State in ſome People of a weak Habit of Body, and actually caſts off; and that in ſuch Circumſtances the mildeſt Food and Liquors raiſe a conſiderable Smart in the Paſſage: And this, I think, may be allowed a Sign of ſuch a Diſpoſition. And I cannot but perſuade myſelf, if it had been duly attended to, we ſhould have had a ſhorter Catalogue of Medicines in the Claſs of the Correctors of the Humors, and much ſeldomer Indications for purging and vomiting in the Scalding of the Stomach. It is true, the Patient I laſt mentioned found the greateſt Relief in her ordinary Fits of Illneſs from the teſta-

ceous Powders, and, while under the *Dyſentery*, from drinking old defecated Lime-water prepared with *Guajac-wood*. But who would dream of an acid as the Cauſe of the Diſorder, when the baring of the Guts was ſo evident; where there was ſuch a Reſemblance between her Caſe and the firſt, where we were ſure that the pureſt Water immediately proved the *Stimulus*, and when the healing Virtues of the teſtaceous Powders and Lime-water are as conſpicuous as that of their being Alcalies? I ſhall not ſay, but, from a Defect of the oleaginous Slime which lines the Guts, ſomething of the ſame Symptoms may appear; but when the Senſe is ſo exquiſite, as in the two Caſes I have adduced, and ſo permanent, I would always ſuſpect ſome Part of the Coat itſelf to be abraded. And as ſuch a Senſe of Scalding and Pain gives an evident Diagnoſtick of the Preſence of the Diſeaſe, ſo I reckon the paſſing *Mucus* an evident Demonſtration of it; and this happening daily without Pain in ſmall Globules in the Niches of the harder Excrement, as I have often obſerved, we muſt allow, that as the Scarf-ſkin daily rubs, or caſts off, in dry Scales; ſo Parts of the cruſtaceous Coat ſeparates and caſts off inſenſibly according to your Suppoſition: And as I have ſeen it, and every one who will give themſelves the Trouble of obſerving, may ſee it under Conſtipation in the human kind; ſo *Lewenhoeck* has been particular in examining it in a Variety of Brutes in a ſound State, as we find in his Letter to *Dr. Aſton*, *De muco inteſtinali*, in the firſt Volume of his Works. But then this, which he and I call *Mucus*, is moſt different from the

ſlimy

ſlimy roping Humor often caſt up in vomiting, and which ſeems to be a redundant Secretion of weakened or ſtimulated Glands, or ſecretory Veſſels: For whereas this eaſily incorporates with Water, and has much of its Colour; the *Mucus* is of a greater Conſiſtency; lies in Parcels, without mixing with the Humors; is of a whiter Colour, and truly vaſcular, though tranſparent: So that I think, for Diſtinction, the other ſhould keep the Name of *Phlegm* or *Pituit*, and this only that of *Mucus*. Which is a Diſtinction I had not made fourteen Years ago, when I printed my Diſſertations; otherwiſe I ſhould not then have called in queſtion what *Lewenhoeck* advances upon the Head; where he tells us, that the moſt obſcure Parts of the *Mucus* paſt in a ſound State, is really ſolid Portions of the Inteſtines, and diſtinct Veſſels. They indeed differ much from the Veſſels we have deſcribed in our Hiſtory, and are exquiſitely leſs, as may be found from his third and fourth Figure of that Letter; where we have them greatly magnified. But as the *Mucus* in a ſound State, is probably made up only of ſome of the finer Veſſels, ſo there is no Reaſon to doubt, but that, under Diſeaſes, when a greater Force acts upon theſe Parts, Veſſels of a very different kind may likewiſe caſt off. For, by the firſt of the Hiſtories I have given, we have a certain Inſtance, that in weaker People, long affected in theſe Parts, the whole Veſſels paſſing the nervous Coat ſeparate and caſt off; and how various theſe are, may be learned from *Ruyſch*, *Sanctorinus* &c. And by the ſecond, we ſee how a certain Set of Veſſels ſeparate from the reſt, or rather keep entire, when theſe which had

had been involved with them are deſtroyed; which we can have no Difficulty to account for, when we find, that, by long drenching Parts of Animals and Plants in Water, we deſtroy the weaker, and preſerve the ſtronger Veſſels: For thus, in a general Diſſolution of the ſoft luxuriant Coat of the Inteſtines, the ſtronger Parts may diſcover themſelves more diſtinctly than in any other Circumſtances. And this Diſpoſition to ſeparate is probably acquired under a long bad Habit of Body, as in the firſt Example; or from the Conſtitution of the Seaſon; which I reckoned to be the Caſe of the ſecond, joined with her Weakneſs, the Year 1739, wherein ſhe ſuffered, being remarkable for its perpetual Moiſture; by which, as there was a great Diminution of the Heat upon the Surface of the Body, and relaxed State of the Solids; ſo the ſmaller ſerous Veſſels would continue a great deal more loaded, and be diſtended, than in other Circumſtances. For it is certainly in the human Body, as Mr. *Hales* obſerves in Plants, that the Courſe by the Roots is in proportion to the Diſſipation by Leaves, Fruit, Stem, *&c.* And *Hippocrates* obſerves, that a moiſt Winter or Spring produces *Dyſenteries* in the following Seaſons, ſuppoſe theſe ſhould be dry; as we find in the 11th and 12th *Aphoriſms* of his third Section. To me the Reaſon appears plain, their being long drenched in Moiſture makes them weak, ſo that they are eaſily affected upon the Swelling of the Humors in the raiſing Seaſons of the Year; which was certainly the Caſe with my Patient, and many others that Year, wherein *Dyſenteries* were very common. But then as to the Fibres

bres that diſcovered themſelves in ſo diſtinct a State, I muſt give it as my Opinion, that they were the ſame *Lewenhoeck* has deſcribed, *Figure* 7th of the Letter we have mentioned; where the Fibres are in their natural State, as he viewed them in a Variety of Subjects no way diſeaſed; and this may account for their not being ſo large as ours: And the viewing them as they lay in the Inteſtines, implicated with many other Veſſels, might prevent his ſeeing the leſſer Veſſels running between them, which the diſeaſed State of theſe Parts had given us Opportunity to ſee; though, when this inner Coat is ſeparated, it is not always ſo prepared as to ſee the Courſe of any of the Veſſels concerned in it, as in theſe Caſes you mention where the whole Coat comes off in one Slough. A particular Inſtance of which we have in the 17th Obſervation of *Tulpius*'s 3d Book; like to which I had one communicated to me by Dr. *George Young*, where the Length of the tubular Membrane was half an Ell; a Piece of which dried I examined with a good Microſcope, but could not ſo much as obſerve any thing fibrous in it, all the Veſſels in it being promiſcuouſly adherent into one Scurf; and probably this may form in the Inteſtines, as the Calloſity forms in the Scarf-ſkin environing the Surface of the Body. The Doctor's Patient recovered very ſoon by the Uſe of anodyne Medicines, that gave the Parts Opportunity, without Diſturbance, to recover themſelves; as in our Patient they did by the Aſſiſtance of *Lime-water*, and as we ſee to happen very ſuddenly in *Dyſenteries*, where the greateſt Quantities of *Mucus* had been diſcharged;

ged; ſo that we have the moſt pregnant Proofs of the eaſy Renovation of this internal Coat. Nor will ſo quick a Renovation of this vaſcular Part appear ſtrange, when the Hiſtory of the *Placenta* is conſidered, as I gave it in the former Volume, where I think we had ſome ſtrong Arguments to convince us, that the whole *Placenta*, which is one thick vaſcular Maſs, was the Product of the delicate nervous *Chorion*; which we may conſider in our preſent Compariſon, anſwering to the *nervous Coat* of the Inteſtines. Nor can we reckon the Compariſon forced, when we conſider how much the pulpy unequal Surface of the one reſembles the other, and how they are employed the ſame Way to draw up Juices for the Nouriſhment of the Body.

I ſhall conclude my Paper with obſerving, that in a great many I have opened dying of a *Volvulus*, I always found a ſtrong Inflammation reaching at once the whole Coats or Thickneſs of the Inteſtines. In one I found more than a Foot of the *Ilium*, of as deep a Red as Vermilion, forced within the *Cæcum* and *Colon*, lying upon the left Side, oppoſite to the Place the *Cæcum* lies for ordinary in the Right ſtuffed hard together into the Bulk of my Fiſt; ſo that it required a conſiderable Force to unfold them. I found the *Cæcum* and moſt of the *Colon* in a ſecond Body, ſtuffed together, though not ſo hard, and lying likewiſe upon the left Side. In a third I found four different Parts of the *Ilium* differently engaged; but the greateſt was not above four Inches, though all greatly inflamed. So that the Inflammation would appear to me to be the original Diſeaſe, and to require large Blooding,

Blooding, rather than ſtrong Purges or Quick-ſilver, recommended by *Ruyſch*, *Theſ.* x. N° 62. both of which I reckon of the worſt Conſequence in ſuch a Caſe; though, when the Suſception takes place, the Caſe ſeems incurable, at leaſt to require more *Hippocrates*'s Remedy, the Bellows, than what works downwards.

LXVIII. *The* Ureters *obſtructed by ſmall Stones*; *by* ALEXANDER MONRO, *P. A.*

AN old Man who had ſuffered under ſome ſevere Fits of the Stone, ſeveral ſmall ones of which he had paſſed, and who afterwards had had violent Hæmorrhagies at his Noſe, recovered, in appearance, a very firm State of Health, without any Complaint, and enjoyed it a conſiderable Time. Being attacked with another Fit of the Gravel, and nothing being evacuated from the Bladder, except now and then a Spoonful of a clear limpid Liquor, which had neither Smell nor Taſte of Urine more than Serum of the Blood has, and no Diſtenſion of the Bladder coming on, was blooded, purged, bathed, and all the other Methods practiſed in Obſtructions of Urine and Stone, were employed in vain, the Obſtruction remained, he became comatous and died.

The left *Kidney* was conſiderably leſs than natural, and was become a thin Sac; the *Ureter* belonging to it was very ſmall, and felt hard. When cut open, it was found fully ſtuffed with Gravel of a dirty black Colour, ſqueezed

zed ſo cloſe together, that no Liquor had probably paſt that Way for a conſiderable Time.

The right *Kidney* was diſtended with Urine to a moſt monſtrous Size, and the *Ureter* was ſo large, that at firſt Sight I miſtook it for a Piece of Inteſtine. Upon opening it down to the Bladder, I found a ſmall Stone, niched ſo firmly between the Coats of the Bladder, that I had ſome Difficulty to bring it out; it was not above a fourth of an Inch from the Orifice of the *Ureter* into the *Bladder*. Two of your Number were Witneſſes to what I have now related.

LXIX. *An ESSAY towards the Diſcovery of a ſafe Medicine for diſſolving the Stone*; *by* ROBERT WHYTT, *M. D. F. R. S. Fellow of the Royal College of Phyſicians, and Profeſſor of Medicine in the Univerſity of* Edinburgh.

Non fingendum aut excogitandum, ſed inveniendum. Bacon.

IN the Year 1739, the Parliament of *Great Britain*, in conſequence of a Petition preſented to the Houſe of Commons by Mrs. *Joanna Stephens*, generouſly ordered her a Reward of 5000 *l. Sterling*, for publiſhing her Medicines againſt the Stone, in caſe upon due Trial their Utility, Efficacy, and diſſolving Power, ſhould be atteſted by the Truſtees named for that Purpoſe. But although the Virtue of theſe Medicines is ſuch as may juſtify the Certificate given of them; yet they are ſo bulky and nauſeous, that ſome People cannot take them, and many

uſe

uſe them with the utmoſt Reluctance; nay, (as the learned Dr. *Jurin* has well obſerved), ſo great is the Reſolution required to go through a Courſe of theſe Medicines, and ſo many are the Difficulties attending it, that there have been not a few Inſtances of ſuch as, after taking them for many Months without any Benefit, have ſubmitted to be cut, rather than go on any longer with a Medicine ſo extremely nauſeous, and which had greatly increaſed their Pains, without bringing any thing away (*a*).

Dr. *Hartley* (*b*) leaving out the ſuperfluous uſeleſs Part of her Compoſitions, has reduced them to two and a half Ounces of Soap, and ſeven and a half Scruples of Egg-ſhell Powder, as the mean Doſe to be taken every Day. But the Powder is ſo nauſeous, and this Quantity of Soap is ſo great, that I ſuſpect we ſhall find few Patients who will continue to take the Medicines thus reformed by him for any conſiderable Time. (*c*).

(*a*) Dr. *Jurin*'s Caſe, p. 4. and 5.

(*b*) See his Supplement to the View of the preſent Evidence.

(*c*) Dr. *Hartley* has lately, for ſuch as can't take the Soap and Powder in a Liquid, publiſhed the following Method of giving them in a ſolid Form, *viz.* To take of *Alicant* Soap eight Ounces; powdered Quick-lime a little ſlak'd, one Ounce; Salt of Tartar, or purified Potaſh, a Dram; and ſhaving the Soap, and mixing it with the Lime and Salt, to beat all into a ſoft Maſs, with the Help of as much Water as is neceſſary: Of this Maſs, from three to four Ounces are to be taken every Day, made into Rolls a little taper at each End, which are to be laid length-ways on the Tongue, and ſwallowed with a Mouthful of Water.

In

After reading the ingenious Experiments publiſhed (1741) by the Reverend and learned Dr. *Hales*, upon Mrs. *Stephens*'s Medicines, I was led to think that Lime-water had as fair a Chance as any thing to diſſolve the Stone. For ſince it there appears, that the Soap owes its Virtues neither to the Potaſh nor Oil, but wholly to the Quick-lime that enters into its Compoſition; and as Mrs. *Stephens*'s Powder which ſhe uſed long before ſhe gave the Soap in any Quantity *(d)*, and which ſhe ſtill lays great Streſs upon, is no other than a Lime; it is very reaſonable to expect great Benefit from Lime-water; which has this further Advantage, that by its Means the Virtues of a greater Quantity of Lime may be ſafely conveyed into the Blood; for in Soap the Lime bears ſo ſmall a Proportion to the other Ingredients, that but a very inconſiderable Quantity of it can in this Form be mixed with our Fluids *(e)*, and of the Powder (already half ſlaked, and

In this Way the Quantity of Soap to be taken daily, is nearly from two Ounces and five Drams, to three Ounces and a half; of Lime-powder, from three Drams to near half an Ounce; and of Salt of Tartar, or purified Potaſh, from a Scruple to near half a Dram.

(d) *Hartley*'s Supplement to the preſent View, p. 1.

(e) In *England* they make Soap with a Lye of Potaſh and Quick-lime, boiled up with Fat and Oil to a proper Conſiſtence; and it is upon the Suppoſition of *Alicant* Soap being alſo made in this Manner that Dr. *Hales*'s Experiments moſtly proceed; for having found a Lye of Potaſh and Quick-lime which is of a Nature moſt intolerably fiery and corroſive, to diſſolve the Stone more quickly than any thing except Spirit of Nitre, it was reaſonable to expect that Soap, of which this conſtitutes ſo conſiderable a Part, ſhould be poſſeſſed of a diſſolving Virtue likewiſe. But I have been

and conſequently greatly weakened by being expoſed ſixty Days to the open Air) only a few Scruples are exhibited a Day. If this Powder is ſwallowed without enough of Liquids along with it, it may be of bad Conſequence, and, I am afraid, has been the Occaſion of great Heat and Uneaſineſs in many People's Stomachs; and if it is ſufficiently diluted, eſpecially with White-wine, Cyder or other aceſcent Liquors as Mrs. *Stephens* directs, it can have little other Effect than weak Lime-water. When to all this it is added, that Lime-water is found by Experience to diſſolve a Stone out of the Bladder, is it not reaſonable to expect, that when taken in large Quantities, and but little weakened by the drinking of other Liquors, the Urine likewiſe may be ſo far impregnated with its Virtues, as to acquire a Power of diſſolving the Stone?

But as reaſoning *a priori*, unſupported by Experience is not ſufficient to aſcertain the Virtues of any Medicine, I embraced the firſt Opportunity that offered to make a Trial of

been informed that at *Alicant* in *Valencia*, where the beſt Soap is made, there is no Quick-lime uſed in its Compoſition, but inſtead of it only Lime-water, which, together with alkaline Salt got from the Aſhes of the Herb *Kali*, and with Oil of Olives, is boiled in large Caldrons that hold ſeveral Tons, till it acquires a proper Thickneſs, when they pour it out on a Floor, and, before it hardens, cut it into Bricks. See alſo *Lemery*'s *Dictionaire de drogues*, p. 485. *Savon eſt une compoſition fait avec l'huile d'olives la plus groſſiere, de l'amidon, de l'eau de chaux, & de la leſſive tirée de cendres du kali. L'amidon*, the Starch, he tells afterwards is only ſometimes added in order to make the Soap whiter and turn ſooner thick.

Lime-water; the Effects of which will beſt appear from the following Hiſtory.

Mr. *David Millar*, Maſter of the Grammar-ſchool of *Kirkaldy*, about ſixty Years of Age, had been often diſtreſſed by Stones paſſing from the Kidneys to the Bladder ſince the Year 1704. Sometimes he has had ſevere Fits of Pain once or twice in a Year, and ſometimes but once in two or three Years, and theſe of two, three or four, and even of eight or fourteen Days Continuance; but always in few Days after theſe Fits he voided one or more Stones till *June* 1740; when, after a painful Fit of Diſtreſs and Sickneſs for two Days, the Stone arrived at his Bladder; but though he uſed his ordinary Means of riding, walking quick, jumping, and drinking plenty of proper Liquors to make it paſs, yet all his Endeavours were in vain.

For half a Year after this, he was troubled with frequent Obſtructions in making Urine, although without any great ſtimulating Pain except in voiding the two or three laſt Drops. Afterwards he thought he found the Stone increaſe, and become heavier in his Bladder; and ſince *March* (1741), upon riding or walking a Mile or two, his Urine was always mixed with Blood: Beſides, from the Beginning of *January* he had loſt all Power of retaining his Urine, ſo that it went from him every eight or ten Minutes, which was accompanied with great ſtimulating Pains; yet ſometimes with Intervals of Eaſe for a Day or two, after ſweating and keeping warm.

At

At first he drank Milk and Water, but in *May* (1741) he began to take Soap, first to the Quantity of half an Ounce every Day, which in the End of *July* he increased to an Ounce, and in the Beginning of *September* to near an Ounce and an half; but all this without any sensible Relief, his Pain, bloody Urine, and Inability to retain his Urine, still continuing as before.

In the End of *September* I advised him to drink with the Soap large Quantities of Lime-water, beginning with one Pound, and gradually increasing the Quantity to three Pounds a Day, and at the same time to drink no more of any other Liquors than was necessary to quench his Thirst.

Within four or five Days, after he began to drink the Lime-water, he recovered in a great Measure the Power of retaining his Urine; and from that Time had less Pain and less bloody Urine, upon using Exercise, than formerly; so that on *November* 13. although he walked upwards of six Miles pretty quick, yet he retained his Water for nine or ten Hours together; and as he voided it with little or no Pain, so he found no Blood mixed with it.

November 15. at Night, when going to Bed, and trying to make Water, he found a Stone entering the Beginning of the *Urethra*, and obstructing it; which it continued to do all Night. He slept little, and often attempted to pass Urine; but could not, unless a very little, and that Drop after Drop. Next Morning, when he was putting on his Cloaths, finding an Inclination to make Water, and endeavouring it

all the Force he could, he voided a ſmooth Stone about the Bulk of a common Bean, of a whitiſh waſhed Colour; whereas all thoſe he had paſſed formerly, were of a brown Colour, and rough. It appeared plainly to be a Part of a larger Stone.

Upon the 17th of *November* he walked upwards of two Miles without any Pain or bloody Urine.

November 18. after making Urine he felt ſomething at the Neck of his Bladder, occaſioning a ſlight obtuſe Pain, which he took to be another Stone.

From this till the Beginning of *December* he was very eaſy, not having been obliged, above three or four times a Day, to make Water; which was never mixed with Blood, nor attended with thoſe ſtimulating Pains he formerly had. Only twice or thrice he found his Urine ſuddenly ſtop, when he was voiding it; and once he thought a Stone was entring the Paſſage, which a little after fell back into the Bladder. When he ſtumbled, or ſtept down a Stair, he ſtill felt ſomething heavy that puſhed or touched him in the under Part of the Bladder. His Urine during all this Time had a great deal of white Sediment, and ſome brownſh Flakes among it; but he was ſo much abroad about his Buſineſs, that he could not make any regular Obſervations upon it.

Upon *Thurſday* Night, the 3d of *December*, the Stone which he ſuppoſed to have been ſtill in his Bladder entered the Beginning of the *Urethra*; where it ſtuck till *Monday* Morning following: During which time his Urine was very

very much obſtructed, coming away in Drops, or in a very ſmall Stream, with a good deal of Uneaſineſs and Pain. From this to the End of *December* he was often in the ſame Condition, the Stone ſticking in the Paſſage ſometimes half a Day, ſometimes a whole Day and a Night, and then falling back into the Bladder; but all theſe Times he never had any of thoſe piercing ſtimulating Pains which he was wont to feel, before he uſed the Lime-water, in paſſing his Urine, and eſpecially after the laſt Drops; and now alſo he was able to retain it half a Day, and then void it without Pain. Immediately after emptying his Bladder, he always ſenſibly perceived the Weight and Preſſure of the Stone, if he but walked a little; but when there was any Quantity of Urine in it, this became leſs perceptible. He concludes a Letter to me at this time with theſe Words. *As I have hitherto enjoyed a good Degree of Health, ſo now I am eaſy beyond Expectation, which makes me think the Stone in a diſſolving State, and that its Surface is very much ſmoothed. I continue uſing the* Soap *and* Lime-water *daily; which laſt I frequently take to my Meat, inſtead of other Drink, and I think my Urine taſtes a little of it.*

On *Monday, January* 4. at Night, he found a Stone had got into the Beginning of the *Urethra*, which in a good meaſure hindered him from voiding any Urine. However, next Morning, after a good Sleep it came away. It is larger than the one he paſſed before,

fore, and is evidently a Piece of the ſame Stone.

For ſome Days after paſſing this Stone, he found the *Urethra* very tender, and a little pained; which occaſioned his making Urine more frequently than uſual. But this ſoon went off; and ever ſince, to uſe his own Words, he has been perfectly free of all Pains and Symptoms of the Gravel, and as eaſy in that Reſpect as ever he was in his Life; and upon the whole, concludes, that he received more Benefit from the Lime-water, than any thing he ever uſed, and to it chiefly aſcribes what has happened above.

As Authors have ſometimes been accuſed of framing Hiſtories to ſupport a certain Theory, or raiſe the Value of ſome favourite Medicine, I thought it might be proper to add the Gentleman's own Atteſtation of the Truth of what has been above related.

Kirkaldy, June 1. 1742.

Having read the Hiſtory of my Caſe drawn up by Dr. Whytt, *I do here, for the Satisfaction of the Publick, declare, that it is in every Particular agreeable to Truth: and that at preſent I am as perfectly free of all Symptoms of the Gravel as ever I was in my Life.*

Da. Millar.

Upon this Hiſtory it is natural to obſerve,

1. That from the Figure and Shape of the Stone firſt paſſed, it evidently appeared to be a Fragment of a larger one, that had lain in the Bladder for about ſeventeen Months, but then

then was broken, and in ſome Degree diſſolved; and as of this no other Cauſe can be aſſigned, but the *Soap* and *Lime-water*, it is but reaſonable to aſcribe it to their Efficacy. That part of the Stone where it has been broke off, has its Edges ſo ſharp, while every where elſe it is ſmooth and rounded, and a red *Nucleus* ſo plainly appears in the middle of it, that no reaſonable Doubt can be had of its being Part of a larger Stone. But this is put beyond all Queſtion by the Stone laſt paſſed, which tallies pretty exactly with the former, is evidently of the ſame Texture, and the two together, excepting a ſmall Deficiency at one End, ſeem to make up a compleat Stone. Whether what is wanting has paſſed in Fragments unobſerved, or has come away quite diſſolved in Flakes and white Sediment, is not ſo certain. Beſides, as he has had no Stones paſſing from his Kidneys to his Bladder ſince *June* 1740; if we deny theſe Stones to have been one, we muſt ſuppoſe them lodged eighteen Months in the Bladder, without either acquiring a greater Bulk, or ever endeavouring to paſs; none of which Suppoſitions are at all likely.

2. The Surfaces of the Stones ſhew them to have been in a diſſolving State. There are Fibres like Roots which run along them, in ſome Places plainly broken off, and the hollow Furrows they had made ſtill remaining. And as the *Lime-water* and *Soap* had longer Time to act upon the ſecond Stone, ſo we find ſtill more evident Signs of Diſſolution about it. It has in moſt Places a very rotten Appearance,

Appearance, and in ſome is eaten ſo deep, that one can ſee ſeveral of its concentrick Layers. Further, as Dr. *Hales* has obſerved, (which will more fully appear in the following Experiments), that the *Calculus* generally turns white in diſſolving, the whitiſh Colour of theſe makes it probable they were in a diſſolving State.

3. It does not appear that the Soap alone had any great Influence in this Caſe: For although from the End of *July*, till about the 8th of *September*, he took an Ounce every Day, and after that near an Ounce and an half; yet he found no ſenſible Relief; which probably might be owing to his not taking it in ſo large Quantities as ſome others have done *(f)*.

4. It would ſeem that *Lime-water* has a very uncommon Efficacy in eaſing the Symptoms, and probably diſſolving the Stone in the Bladder: For in five Days after Mr. *Millar* began to drink it, he was able to retain his Urine better than he had done for eight or nine Months before, and found the ſtimulating Pains in making it leſs, and the Quantity of Blood in it ſenſibly to diminiſh; ſo that upon the 13th of *November*, although he walked ſix Miles pretty quick, he had none of it, nor has had ever ſince; and on the 16th of the ſame Month (having uſed it little more than ſix Weeks) he paſſed the firſt Stone. Nor is it at all unreaſonable to ſuppoſe that *Lime-water*

(f) The mean Quantity ordered by Mrs. *Stephens* is two and a half Ounces.

water may have a greater Effect in diſſolving the Stone than *Soap*, ſince we find it poſſeſſes a greater diſſolving Virtue out of the Bladder. *See Experiments below*, N° 11. *compared with* N° 70. *and the Table near the End of this Eſſay.*

That the *Lime-water*, from its Aſtringency and ſtrengthening Quality, ſhould have a more ſudden Effect in curing the Incontinency of Urine, than the Pain and Blood that, upon Motion, generally accompanied it, is eaſily accounted for; ſince, as the two laſt proceeded chiefly from the rough Sides of the Stone grating upon, and tearing the Blood-veſſels on the internal Coat of the Bladder, this muſt in part have continued to happen till the Points were worn off its Surface; and accordingly we find the firſt Stone was pretty ſmooth when he voided it. But, beſides this, after the Stone once begins to diſſolve, its Surface is either covered with a whitiſh *Mucus*, or ſoft rotten Scales or Layers, which are thrown off one after another. *Vid. Exper. below.*

5. It may not be amiſs to take notice, that although Mrs. *Stephens*'s Medicines almoſt always occaſion great Pain and Heat of Urine for ſome Weeks, or even Months, after firſt taking them (*g*); yet the *Soap*, in the Way Mr. *Millar* took it, gave him no ſuch Uneaſineſs; and the *Lime-water* had ſo very contrary an Effect, that in a few Days it relieved ſome of his Complaints, and abated others. As

(*g*) See Dr. *Hartley*'s View of the preſent Evidence, *&c.* and Dr *Kilpatrick*'s Caſe, written by himſelf.

As the Pain and Heat of Urine in taking theſe Medicines ſeem chiefly owing to the alkaline Salt, which bears ſo great a Proportion in the Compoſition of the *Soap*, is it not probable, that it was from his beginning to take the *Soap* in very ſmall Quantities, and gradually increaſing the Doſe, as well as never taking ſo much of it as is ordered by Mrs. *Stephens*, that Mr. *Millar* eſcaped this Complaint?

Finding his Stomach unable to bear the *Soap* in Decoction, he took it every Morning in Subſtance, only ſliced down; and found it agree very well with him, excepting that it ſometimes gave him a little of the Heartburn. And the *Lime-water* and Soap were ſo far from having any bad Effect upon his Health, that he rather found himſelf eaſier and lighter, and conſiderably freer of ſome kind of Lowneſs of Spirits he had laboured under.

6. As Mr. *Millar* continued from the Beginning of the Year 1742, when this Paper was firſt written, to *June* 1751 when he died, perfectly free of all Symptoms of the Stone, without taking Medicines of any kind, ſo there can be no Doubt but that the Stone, which gave him ſo much Uneaſineſs, was wholly brought away by the Uſe of the Lime-water and Soap; for if any Part of it had remained, it muſt, in ſo long a Time, have acquired Bulk ſufficient to have produced the like uneaſy Symptoms, with which he had been formerly afflicted. And here it is worthy of Obſervation, that Mr. *Millar*, by the Uſe of theſe Medicines was not only cured of the Stone in the Bladder, but rendered, during the Remainder

mainder of his Life, almoſt quite free of nephritick Complaints, to which he had been very ſubject for many Years before.

By this Succeſs of the *Lime-water*, I was induced to make the following Experiments, with a View to a further Diſcovery of its Nature and Virtues.

SECTION I.

Experiments with Quick-lime.

MALT SPIRITS poured upon a Piece of freſh calcined Lime-ſtone, are plentifully abſorbed by it, without any ſenſible Ebullition, (ſome Air-bubbles excepted, that ariſe from its Surface); nor is it ſlaked but after lying a great many Hours in them.

I immerſed a Piece of Quick-lime in rectified Spirit of Wine, in a cloſe ſtopped Bottle, which after eight Days ſcarcely ſhewed any Appearance of being ſlaked.

2. Vinegar is ſomewhat more plentifully abſorbed by Quick-lime than Spirits, with a good many Air-bubbles, and hiſſing Noiſe at firſt, which however ſoon ceaſes; and if the Lime is freſh from the Fire, it will ſcarcely be ſlaked, unleſs allowed to continue many Hours in it.

Water, whether cold or hot, poured upon Quick-lime that has lain ſometime among Spirits or Vinegar, produces no Ebullition, except a very few Air-bubbles at firſt; and the Stone that has been in the Vinegar is longeſt in being ſlaked.

3. Oil is plentifully imbibed by Quick-lime, without any Ebullition or Heat. If there is any Rent in the Stone, a few Air-bubbles will ſometimes riſe out of it. When put in boiling Water after this, a good many Bubbles of Oil riſe from the Surface of the Stone; and, after ſeveral Hours ſtanding, it begins to melt down into a ſoft, fat, argillaceous Subſtance.

Hence it ſeems probable, that Oil, by filling the empty Pores, and ſheathing perhaps the fiery Particles of Quick-lime, deſtroys its Efficacy ſo as to hinder its Ebullition with Water: While, on the other hand, Oil has its Nature ſo far changed by Lime, that it becomes miſcible with Water (*b*).

4. Upon putting a Piece of Quick-lime in Claret Wine, a conſiderable Ebullition immediately happens; but in twenty four Hours the Stone is ſcarce diſſolved.

A Piece of Quick-lime being put into briſk ſtrong Ale, a good many Air-bubbles immediately aroſe with ſome Noiſe; but this was quickly over. After twenty four Hours one third of the Stone was not ſlaked.

Small Beer has much the ſame Effect; only the Ebullition is greater, and laſts longer.

Water, whether cold or hot, poured upon a Piece of Quick-lime that has lain ſome time in

(*b*) Oleum ſolum calci miſcetur, quando utrumque aquas odit. *Plin. hiſtor. natur. Lib.* 24. *cap.* 1.

Calx aqua accenditur, eademque oleo reſtinguitur. *Id. Lib.* 33. *cap.* 5.

Si oleum roſarum vel liliorum alborum vel lini probè agitetur in mortario cum aquâ calcis, ambo coaleſcunt in modum butyri. *Etmuller.*

in Ale or Beer, produces no Ebullition, nor eaſily diſſolves it.

5. The Heat or Cold produced by the Mixture of the above Liquors with powdered Quick-lime, I found to be as follows.

When Quick-lime was mixed with Lamp-ſpirits, the Thermometer fell, in two or three Minutes, from 54 to 53 Degrees.

With Vinegar it roſe, in five Minutes, from 52 to 68 Degrees; after which it began to fall.

With Claret it roſe, in ſix Minutes, from 51 to 56 Degrees.

With ſtrong Ale it roſe, in ten Minutes, from 48 to 57 Degrees.

With cold Water it roſe, in twenty two Minutes, from 48 to 112 Degrees, and then began to fall (*i*).

6. Ten times its Weight of boiling Water being poured upon freſh burnt Lime-ſtone, there immediately ariſes a great Ebullition, which laſts a conſiderable Time; when this is over, the Lime falls to the Bottom, and the clear Water above, being filtrated through brown Paper, is that which I made uſe of in the following Experiments. The Proportion of 8 to 1 ordered in the *Edinburgh* Diſpenſatory, ſeems rather too ſmall, as it affords but very little Water, if the Lime-ſtone be well burnt, and freſh from the Fire: Nor have I obſerved any remarkable Difference in the Strength

(*i*) The Quantity of Quick-lime uſed in this Experiment was very ſmall, otherwiſe the Thermometer would have riſen much higher.

of the Lime-water made with theſe different Proportions.

Cold Water being added to Quick-lime, ſoon produces a conſiderable Heat and Ebullition, and this Water has the ſame Virtues as the above.

7. If Quick-lime be mixed with freſh Urine, it inſtantly ſends forth a pungent Vapour which ſtrikes the Noſtrils in much the ſame Manner as volatile Ammoniac Salt.

SECT. II.

Experiments with Lime-water *upon* Urine.

As the calculous Concretions of the Kidneys and Bladder are generated by the Urine, and owe their Growth entirely to a conſtant Appoſition of Particles derived from that Fluid, I thought it might be worth while, before making any Experiments on the *Calculus*, to try the Effects of *Lime-water* upon *Urine* and its *Sediment*.

8. If two Ounces of Lime-water be added to an equal Quantity of freſh-made Urine, the Mixture inſtantly becomes whitiſh and turbid; and, in a little Time, a light white Sediment falls to the Bottom, leaving the Liquor above perfectly pellucid, of a fine light Limon-colour (*k*), without any Scum or Cruſt on the Sides of the Glaſs.

9. I let ſome freſh Urine ſtand by itſelf in a Glaſs about forty eight Hours; in which Time

(*k*) This, as well as the Quantity of white Sediment, varies according to the Strength of the Urine.

Time it had depoſited a rediſh brown Sediment upon the Bottom of the Glaſs, with a Cruſt of the ſame Nature upon its Sides. I then decanted off the clear Urine, leaving the Sediment and Cruſt alone, and filled up the Glaſs with Lime-water: Upon which the Sediment immediately roſe from the Bottom, loſt its Colour, and the Mixture became white and turbid; the Cruſt on the Sides of the Glaſs quickly diſappeared; and in a ſhort time a large light white Sediment fell to the Bottom which, though allowed to ſtand thirty Hours, did not in the leaſt adhere to, or leave any Cruſt upon the Bottom or Sides of the Glaſs.

Having poured off what was clear, I added ſome White-wine Vinegar to this Sediment; upon which it immediately diſappeared, and the Liquor became pretty clear, not unlike Sherry; which however, after ſome Hours, let fall a dark-coloured Sediment.

α Hence we ſee that Lime-water has not only a Power of hindering the Urine from reſolving into thoſe Principles which are imagined to give Riſe to the Stone, but alſo of deſtroying and changing their Nature after they are ſeparated from it; whence ariſes a ſtrong Probability, that it may not only hinder the Generation of the Stone in the human Body, but diſſolve it after it is formed: Nay, altho' it ſhould be allowed, that Lime-water does in a great Degree loſe its diſſolving Power before it arrives at the Bladder; yet if it ſhall, by deſtroying the petrifying Quality in the Urine, hinder any new Accretions

to the *Calculus*, this muſt neceſſarily in Time have its Surface waſhed down, and worn away, by the Urine continually running along it, and the Coats of the Bladder acting upon it; as we find even the hardeſt Rocks yield to common Water.

Quid magis eſt ſaxo durum? quid mollius unda?
Dura tamen molli ſaxa cavantur aquâ. Ovid.

But that the diſſolving Quality of the Lime is really communicated to the Urine, evidently appears from Experiments made with the Urine of ſuch Patients as have taken Mrs. *Stephens*'s Medicines for a conſiderable Time in large Quantities. Thus Mr. *Geoffroy* found, that a pretty hard *Calculus* had loſt ſomething of its Weight, and had its Surface corroded, by having daily poured upon it for ten Days the freſh Urine of a Patient who had taken Mrs. *Stephens*'s Medicines for upwards of a Month (*m*). And, if I remember right, much the ſame Experiment was tried by Dr. *Kirkpatrick* on his own Urine, and with the ſame Succeſs (*n*).

β Do not theſe Experiments afford us a clear Reaſon why the Stones which Mr. *Millar* paſſed after drinking the Lime-water, were of a whitiſh Colour, whereas all that he had voided, for thirty Years before, were browniſh? And do they not likewiſe render it probable, that the great Quantity of white Sediment in the Urine of ſuch People as have taken Mrs. *Stephens*'s Medicines, has been owing to the Action of the Lime contained in them? For we

(*m*) *Memoires de l'Acad. des ſciences*, an. 1740. Edit. 8vo p. 261. 262.

(*n*) See his Caſe written by himſelf.

we find Lime-water produce that Sediment in Urine out of the Bladder, and by drinking Lime-water Mr. *Millar*'s Urine depoſited it in great Abundance. The Quantity of this, however, will be increaſed by what is daily waſhed off the Surface of the Stone by the Efficacy of the Medicines.

Does it not likewiſe appear plain from theſe Experiments, why Dr. *Jurin*'s Urine (*o*) (eſpecially after his largeſt Doſe of *Soap-lees*) was whitiſh and turbid when he firſt made it, and afterwards depoſited a *calcarious* Sediment, as he calls it; but which, notwithſtanding the Opinion that has hitherto prevailed of its being furniſhed in a good meaſure by the Medicines (*p*), ſeems to have been owing ſolely to the Change made by the Lime upon the Sediment of the Urine. And that Lime-water not only changes the Colour of the Urine, but of the Surface of the *Calculus* itſelf, plainly appeared in a Stone (taken from the Body of *John Greig*, who died *December* 1741, in the Royal Infirmary, of an Iliac Paſſion) which had its external Surface almoſt entirely white and a little rotten, while within it was of a ſandy Colour. Of this no Reaſon could be aſſigned, but his having drank Lime-water for eight Days, to the Quantity of about an *Engliſh* Pint a Day. And it is obſervable, that as he left off the Lime-water eight or ten Days before his Death, ſo in ſome Places there was a browniſh Cruſt beginning to grow over the white Surface.

10. *April* 15. I put into a Phial a Scruple of

(*o*) Jurin's Caſe, p. 12.
(*p*) Hales's Experim. p. 12.

of Oiſter-ſhell Lime and ten Drams of freſh Urine. Into another, I put the ſame Quantities of Salt of Tartar and freſh Urine: Both theſe Mixtures immediately ſent forth a Vapour which affected the Noſe with a pungent Ammoniacal Smell. Into a third Phial I put equal Parts of freſh Urine and Lime-water, which gave an extremely faint Smell of the ſame kind. And, into a fourth one, the ſame freſh Urine alone. Having corked theſe ſeveral Phials, I did not open them till the 16th of *May*, when the Urine with Quick-lime had an extremely offenſive Smell, not to be deſcribed in Words. The Urine mixed with Lime-water had a diſagreeable Smell of the ſame kind, but not ſo ſtrong. The Urine with Salt of Tartar ſmelled like ſtale Urine, and did not affect the Noſe near ſo diſagreeably as the two former. The Urine without any Mixture had a ſtale Smell, but not ſo ſtrong as that which was mixed with Salt of Tartar.

Hence it appears that Quick-lime, Lime-water and fixed alcaline Salts not only volatiliſe the Salts of the Urine, but alſo corrupt its Oils, altho' Quick-lime and its Water produce this laſt Effect much more remarkably than the alcaline Salt.

SECT. III.

Experiments with Lime-water upon the Calculus.

In the following Experiments I made uſe of two *Calculi*.

The firſt, which, for Brevity, I ſhall denote

note by *A*, was given me by my ingenious Friend and Collegue Mr. *Monro* Professor of Anatomy in this Place. It was of a close Texture, and very hard, and of a grey sandy Colour.

The second, *B*, was the one which I just now mentioned to have been taken out of *John Greig*'s Bladder. It seemed fully as hard as the former, and was capable of receiving a pretty fine Polish. It weighed an Ounce and a half, and its specifick Gravity was to that of Water, as 1704 to 1000. Its Colour was pretty much the same with the former.

11. A Fragment of *A* weighing 23 Grains, being put in Stone Lime-water, and kept in a moderate Heat, was mostly all rotten and dissolved in little more than thirty Days.

A Fragment of *B* weighing 10 Grains, after two Days and nine Hours warm Digestion in the same Lime-water, had two Grains of its Substance rotten and dissolved.

12. Some Stone Lime-water that I made by slaking Quick-lime with boiling Lime-water, dissolved a Piece of *A* of five Grains in about seven Days.

13. A Fragment of *A*, Gr. vi. after seventeen Days cold Digestion in Stone Lime-water in the Month of *February*, had lost none of its Weight, nor was its Surface very sensibly softened, altho' it had somewhat of a rotten Appearance; while a Piece of *B* of 12 Grains, in six Days cold Maceration in the End of *May*, had two and a half Grains of its Weight dissolved.

From this Experiment, together with N° 20.

and

and 57. below, one may be able to account for Dr. *Lobb*'s having found Lime-water to have no Power of diſſolving the Stone (*q*): For if the Lime-ſtone uſed in making the Water was not freſh from the Fire (*r*); and if the Experiment was made in an open Veſſel, and in the Winter-ſeaſon, it is no great Wonder if, even after a cold Maceration of twelve Weeks, there was no Appearance of Diſſolution about it.

It is obſervable, that although the Chymiſts ſeem generally to have been of opinion, that there lay concealed in Quick-lime a powerful Remedy againſt the Stone, which by their Art might be extracted out of it; yet none of theſe Authors that I have met with among the many Diſeaſes for which they have highly commended Lime-water, ſo much as hint at its being ſerviceable in the Stone or Gravel; in which Diſeaſes, however, its Virtue is perhaps more remarkable than in any other. And one may almoſt venture to affirm, notwithſtanding the Boaſtings of many Chymical Writers, of their Spirit of Quick-lime, and other ſecret Preparations of it, that its Virtues are more eaſily extracted, and more ſafely conveyed into the Blood by its Water, than any way elſe.

Having thus found a conſiderable Power of diſſolving the *Calculus* in Stone Lime-water, I thought it might be worth while to inquire, whether Animal-lime poſſeſſed the ſame Virtue,

(*q*) Treatiſe of Diſſolvents of the Stone, p. 326.

(*r*) That this was the Caſe, is highly probable, ſince he made his Water with unſlaked Lime, which he, in the next Paragraph, tells us was Lime a little ſlaked.

tue, and whether in a greater or leſſer Degree.

14. A Piece of *A* weighing nine Grains, was diſſolved by lying ſeventeen Days in Lime-water made with calcined Egg-ſhells, in a digeſting Warmth; and this, I am apt to think, might have happened ſomewhat ſooner, had the Shells been more carefully calcined.

15. A Fragment of *A* of ſix Grains was, by two Days warm Digeſtion in Lime-water made with Oiſter-ſhells, reduced to two Grains, and in three Days to leſs than one Grain.

16. A Piece of *B*, eight Grains, in thirty ſix Hours warm Digeſtion in Oiſter-ſhell Lime-water, had about three and one fourth Grains of its Subſtance diſſolved.

17. Having calcined a few Cockle-ſhells, that had lain long expoſed to the Weather, I put a Piece of *B*, eight Grains, in ſome of the Lime-water made with them; which in thirty ſix Hours warm Digeſtion loſt near three and a half Grains.

The Lime-water, eſpecially that from Shells, generally diſſolves the Stone by making it throw off white rotten Cruſts or Scales; which, if allowed to lie long enough among the Water, and if the Glaſs be ſhaken now and then, are reduced to a ſort of white *Mucilage*, reſembling in ſome Degree the white Sediment of N° 9.; but which, when dried, has the Appearance of fine powdered Chalk. This ſerves farther to ſhew that the white Sediment in the Urine, of ſuch as drink Lime-water, is not derived from the Lime, but wholly

wholly from the Parts of the Stone, and groſſer Parts of the Urine, thus changed by the Lime-water (*f*).

18. A Piece of *A*, ſix Grains, was rendered pretty ſoft, and entirely rotten, by a cold Maceration of ſeventeen Days in Oiſter-ſhell Lime-water, in the Month of *February*; but *May* 19. having infuſed, cold, a Fragment of *B*, eleven Grains, in ſome of the ſame Lime-water, it loſt in three Days near five Grains, and in eight Days was reduced to a *Nucleus*, weighing three Grains.

Here it may be proper to obſerve, that, unleſs the *Calculus* be ſmall, and the Quantity of Lime-water in which it is immerſed, be large, the Water muſt be renewed at different Times, ſince its Virtues are weakened in proportion to the Quantity of the Stone which it has diſſolved; and, as far as I have been able to obſerve, leſs than half a Dram of *Calculus* reduced to a fine Powder, is ſufficient to deſtroy the Virtue of two Ounces of ſtrong Lime-water in which it is infuſed.

From theſe Experiments it appears, that Oiſter and Cockle Shell Lime-water poſſeſſes a much greater Power of diſſolving the *Calculus*, than that of Stone-lime. Nor is this laſt only inferior in its lithontriptick Virtue, but alſo as it is leſs homogeneous and ſafe, ſince the Lime-ſtone may be impregnated with metallick or mineral Principles, which even the Fire may not be able wholly to deſtroy.

Although,

(*f*) *See* No. 9. above.

Although, as has been already hinted, I don't find that Lime-water has been preſcribed till of late in the Gravel, or for diſſolving the Stone in the Bladder; yet, ſince the firſt Publication of theſe Papers, I have met with a Paſſage in an Epiſtle of *Olaus Borrichius* to *Thomas Bartholine*, by which it plainly appears, that the Power of Shell Lime-water to diſſolve the *Calculus* out of the Bladder, was long ago known to this Author. His Words are, *Conſtat autoritate Baſilii Valentini aliorumque, nihil in calculo profligando utilius ſpiritu calcis vivæ; mihique iterum iterumque compertum aquam calcis vivæ oſtreorum, mytilorumque, ſolvere calculos ordinariè ab ægris exſectos in mucilaginem, ſi aliquot dierum leni fotu in calido ſimul detineantur (t).*

19. In order to know what Proportion of Water was beſt to be added to the Shell-lime, I poured twenty one Ounces of boiling Water upon three Ounces of freſh calcined Oiſter-ſhells, reduced to a groſs Powder, and a great Ebullition ſoon enſued, which laſted a conſiderable Time. A Piece of *B*, thirty one Grains, by lying thirty ſix Hours in this Lime-water with a Heat betwixt that of the human Body and melting Wax, loſt ſeven Grains of its Weight.

Having afterwards added twenty five Ounces of boiling Water to two and a half Ounces of the ſame calcined Shells, there did not happen any ſuch ſtrong Ebullition as before; only a Noiſe at the Bottom of the Veſſel, and ſome ſmall Agitation in the Liquor, ſuch as com-

(t) Bartholin. epiſt. centur. iv. epiſt. 76.

monly is to be obſerved in Water before it begins to boil. A Piece of *B*, thirty one Grains, being kept thirty ſix Hours in this Lime-water in the above mentioned Heat, loſt only five Grains.

To make therefore Lime-water with Oiſter or Cockle-ſhells, the Proportion I would recommend is 7, or at moſt 8 *lib.* of Water to one of calcined Shells *(u)*. Nor is there any Danger in the Strength of Lime-water made in this Manner; for I have ordered near four *Engliſh* Pints of it to be drank by a Man, and two by a Boy of eight Years of Age, every Day, without any Inconveniency.

The Shells will calcine in any Fire, provided it be hot enough: and the Cockle and Oiſter with much leſs Trouble than the Egg-ſhells. If they are friable, and quite white, they are ſufficiently burnt; but if blackiſh or grey, they muſt be put into the Fire again.

It may perhaps be worth while to obſerve, that if the calcined Shells are taken from the Fire while it burns ſtrong, or before it is become very weak, the Water poured upon them generally gets a very diſagreeable ſulphureous Taſte, which is probably owing to the Coals.

If cold Water be poured upon Shell-lime, very little Heat or Ebullition enſues; yet the Lime-water thus procured ſeems to have as great a Power of diſſolving the Stone, as when made with boiling Water; but is more harſh and diſagreeable, the other having a Softneſs and Sweetneſs which this wants.

The

(u) An earthen Veſſel is preferable for this Purpoſe to a wooden or Copper one, as the firſt will probably give it a bad Taſte, and the ſecond poſſibly a worſe Quality.

The Water, whether cold or hot, ſhould be allowed to ſtand nine or ten Hours on the Shells, or longer if the Quantity of Water added to them, is in a greater Proportion than eight to one.

If any one before reading this Paper, ſhould chance to have conſulted Mr. *Lemery* upon Lime-water, either in his Chymiſtry or *Pharmacopeé univerſelle*, he will perhaps be ſurpriſed to find three or four *Engliſh* Pints of this ordered to be taken every Day, while that learned Chymiſt talks of its Doſe, as from one to four Ounces; ſpeaks of its raiſing great Thirſt, and being in Danger of burning the Stomach; upon which account he orders Syrup of Violets to be mixed with it, and prefers the ſecond Water to the firſt. Perhaps from ſuch Authority it partly was, that many Phyſicians have been uſed to preſcribe this Medicine with ſo ſparing a Hand; and I own, that firſt when I began to order Lime-water for the Stone, I was afraid to exceed an *Engliſh* Pint of it a Day; but, as repeated Experience has taught me, that there is nothing to be dreaded from it when taken in much larger Quantities, I imagine Mr. *Lemery*'s Suſpicions of its doing Miſchief in large Doſes, or when taken unmixed with any thing to ſoften it, were not ſo much owing to any Experience of its bad Effects, as to Theory. Quick-lime is remarkably corroſive, and ſeems to act by its Fire; therefore it was natural to think, that Lime-water impregnated with the ſame Fire, might have the ſame Effect, though in a leſs Degree.

20. I infuſed a Fragment of *B*, ſeven Grains, in ſome Lime-water made with Oiſter-ſhells that had lain thirty five Days in the open Air after calcining; which, being kept in a moderate Heat for four Days, had only about three Grains of its Subſtance rotten and diſſolved; whereas a Piece of *B*, eight Grains, by digeſting three Days and twelve Hours in Lime-water made with Shells freſh from the Fire, loſt about ſix Grains: Nay, I have obſerved, that after the Shells have been but fifteen or twenty Hours from the Fire, they neither make ſuch an Ebullition with the Water, nor have ſo great diſſolving Power, as when juſt taken warm from it.

I have made Experiments with Lime-water and ſeveral other Stones, but have never yet met with any that were able to reſiſt the Oiſter or Cockle Shell Lime-water, although ſome that were extremely hard, and of a dark brown Colour, diſſolved a good deal ſlower than either *A* or *B*.

I had indeed ſent me a few ſmall Stones, all of them of a particular Shape, reſembling pretty much the Stone of a Raiſin, perfectly ſmooth, and variegated ſomething like a poliſhed Pebble; to which their exterior *Cortex* ſcarcely yielded in Hardneſs. Upon theſe the Lime-water had no manner of Influence. But if theſe Stones came from the urinary Paſſages, as I was told, they were of a Texture quite different from all the Gravel-ſtones I have ever ſeen; and their being all pretty much of one Bulk and Shape, makes it probable that they were generated in ſome particular Cavity. In the

the *Philoſophical Tranſactions* (*v*) we have the Hiſtory of a Woman in *Swiſſerland*, who paſſed by the Anus great Quantities of Stones like Flint. And I have ſeen a Concretion paſſed by Stool, longer, but not ſo thick as a Hen's Egg, with its exterior *Cortex* as ſmooth as a poliſhed Pebble, though internally it was of a ſpongy fungous Conſiſtence. In the ſame *Tranſactions* we read of a Shell having been found in one of the Kidneys of a Lady who had been often ſubject to violent Vomitings (*w*); which it is very likely the Lime-water would not have diſſolved. And *Bartholine* mentions Stones ſaid to have been extracted from the Bladder, of a flinty Hardneſs (*x*); though *Olaus Borrichius* ſeems to doubt of this (*y*). But as theſe Concretions are as different in their Nature from common *Calculi*, as Flint or Shells are from Free-ſtone, and beſides are extraordinary and very rare, Lime-water (eſpecially that from Oiſter or Cockle Shells) may be ſtill looked upon as a pretty univerſal Diſſolvent of calculous Concretions.

As the calculous Concretions of the Urine have been thought to have ſome Analogy to the tartarous Cruſt left by Wine upon the Sides of the Caſk, it may perhaps be worth while to obſerve, that Lime-water diſſolves *Tartar* pretty quickly; but, as its Virtue is ſoon deſtroyed by the Acidity of the *Tartar*, the Affuſion of freſh Lime-water muſt be frequently repeated.

(*v*) Lowthorp's Abridgment. Vol. 3. p. 167.
(*w*) Lowthorp's Abridgment. Vol. 3. p. 162.
(*x*) Epiſt. 45. cent. 4.
(*y*) Barthol. epiſt. 76. cent. 4.

21. The Reverend and ingenious Dr. *Stephen Hales* having wrote me laſt Summer (1751), that he had found Oiſter-ſhell Lime-water, made with a Pound of Lime to an *Engliſh* Gallon of Water, rendered ſenſibly more pungent to the Taſte, as well as a more powerful Solvent of the Stone, by pouring it on calcined Shells red-hot from the Fire; I made the following Experiments with a View to determine with ſome Preciſion the different Strengths of different Lime-waters.

(*a*) *June* 6. At Nine in the Evening, I poured upon a Pound of calcined Oiſter-ſhells hot from the Fire, ſeven Pounds of boiling Water.

(*b*) Next Day, at Eight in the Evening, I poured two Pounds of this Lime-water upon half a Pound of calcined Oiſter-ſhells newly taken from the Fire, and ſtill warm. Thirteen Hours after this, I decanted off and filtered fourteen Ounces of each of theſe Waters.

(*c*) At the ſame time I filtered the like Quantity of Lime-water, which was procured by pouring, forty eight Hours before, ſeven Pounds of boiling Water upon a Pound of calcined Oiſter-ſhells, which, in the Space of four Days and a half, had formerly got three ſuch Waters.

(*d*) I filtered alſo fourteen Ounces of Lime-water, made by pouring ſeven Pounds of boiling Water upon one Pound of Stone-lime, taken a few Hours before from the Fire.

In order to find the ſpecifick Gravities of theſe different Lime-waters (the firſt of which we ſhall, for brevity's ſake, call A, the ſecond B, the third C, and the fourth D), I weighed,

ed, with the Aſſiſtance of my Collegue Dr. *John Stuart* Profeſſor of Natural Philoſophy, a large Glaſs-phial filled with Sand, and hermetically ſealed, firſt in Air, and then immerſed it in the Fountain-water of this City (uſed alſo in making the ſeveral Lime-waters), by which it loſt 3704 Grains of its former Weight. Being next weighed in B, it loſt 3727 Grains. In A it loſt 3720 Gr.; in C 3710 Gr.; and in D 3713. Hence it appears that the ſpecifick Gravity of the double Lime-water B, was to that of *Edinburgh* Water, nearly as 169 to 168. The Gravity of A was to that of the ſame Water, nearly as 232 to 231; of C nearly as 617 to 616, and of D nearly as 411 to 410. At another time I found, by the ſame method, the ſpecifick Gravity of ſome Lime-water procured from Oiſter-ſhells; upon which, during the Courſe of twelve Months, I had at different times poured, at leaſt, a hundred times their Weight of Water, to be to that of Fountain-water, nearly as 926 to 925.

It may be proper to obſerve, that both A and B were made with Oiſter-ſhells, which had lain buried in the Rubbiſh on the South-ſide of the Caſtle of *Edinburgh*, probably above a hundred Years; becauſe, if they had been newly got from the Sea, the Salt which they contain even after Calcination, would probably have increaſed the ſpecifick Gravity of the Waters poured on them, and ſo have rendered the Experiment leſs accurate.

The Taſtes of A, B, C, and D, as well as their ſpecifick Gravities, ſhewed their different Strengths. A and B had much the ſame kind of

of Taſte, but B was ſenſibly more pungent; C had much leſs Pungency than either of the two former, and left a Sweetiſhneſs in the Mouth, ſomewhat reſembling the Taſte of Liquorice Root; D did not differ much from C as to its Taſte.

I put three Pieces of a very hard *Calculus*, each weighing ten Grains, into three different Phials; one of which I filled with the Lime-water A; another with B, and the third with C. After they had ſtood in the ſame Degree of Warmth 93 Hours, I found that the *Calculus* in the double Lime-water B, had two Grains of its Subſtance diſſolved or rotten; the *Calculus* in A had loſt ſomewhat more than a Grain and a half, and that in C, a Grain.

Hence it follows, that Water does not acquire the ſame preciſe Degree of Strength, whatever be the Quantity of Quick-lime upon which it is poured; as is obſerved of Wine, in which *Crocus Metallorum* is infuſed; but that Lime-water is ſtronger or weaker in proportion as a greater or leſs Quantity of Quick-lime is added to the Water; that where the Proportions of theſe two are equal, freſh calcined Shells impregnate Water more ſtrongly, than ſuch as have had ſeveral Affuſions before; and that Lime-water, made with calcined Shells, hot from the Fire, may be rendered remarkably ſtronger, by pouring it a ſecond time on freſh burnt Shells. It is, however, obſervable, that this double Lime-water, if it ſtands on the Shells a few Days, loſes ſome of its Pungency and Strength, while the weaker Lime-waters are conſtantly ſupplied with freſh

Virtue

Virtue from the Shells, ſufficient to make up what they loſe by the Contact of the Air.

Farther, we ſee that Stone-lime does not impregnate Water ſo ſtrongly with its Virtues as Shell-lime. Whether this may be owing to the greater Subtility of the latter, whereby it more eaſily mixes with, and is ſuſpended in the Water, or whether it may not proceed from ſome other Cauſe, I ſhall not preſume to determine: But from the greater ſpecifick Gravity of Shell Lime-water, we are enabled to account for its diſſolving the *Calculus* more powerfully than Stone Lime-water.

But altho', from the above Experiments, it evidently appears, that freſh calcined Shells afford a ſtronger Water than ſuch as have been expoſed for any conſiderable Time to the Air, and that the firſt Water poured on Quick-lime is ſtronger than the ſucceeding ones; yet it is far from being true, that Quick-lime is ſoon deprived of its Virtues by repeated Affuſions of Water, or that the third or fourth Water procured from it is altogether inſipid, as ſome have affirmed (z). 'Tis true, indeed, that freſh calcined Shells impregnate Water with their Virtues ſooner, as well as in a greater Degree, than Shells which have been in ſome meaſure ſlaked by long Expoſition to the Air; and that when repeated Waters are poured upon Quick-lime, it communicates its Virtues not only more ſlowly, but alſo, ſtrictly ſpeaking, in a leſs Degree to each

(z) *Memoires de l' Acad. des Sciences* 1700, *Edit.* 8vo. p. 160 and 170.

each ſucceeding Water (*a*): But nevertheleſs, Quick-lime is ſo far from having its Virtues wholly extracted by a few Affuſions of Water, that ſome Stone-lime, which had been reduced to a Powder, by being expoſed to the open Air for four Months, ſtill retained ſome of its Virtue, after having had, during the Courſe of ſixty Days, 260 times its Weight of Water poured upon it: and ſome Lime-water procured from calcined Oiſter-ſhells, upon which, in 48 Days, I had poured 270 times their Weight of Water, was, by Experiment, found to be poſſeſſed of a conſiderable Power of diſſolving the Stone.

Hence we may ſee why Lime, which has been uſed, ſince the Times of the *Romans* (*b*), as a Manure retains its Power of fructifying the Ground for many Years.

It follows alſo, from the above Experiments and Obſervations, that calculous Patients may not only uſe, with Advantage, the firſt, but alſo ſeveral more Waters procured from Quick-lime: And, perhaps, it were adviſable for them to begin with the 3d and 4th Waters, and uſe them for ſome Days before they try the firſt Water, which has a more pungent and diſagreeable Taſte.

SECT.

(*a*) Calcined Shells, taken freſh from the Fire, will, in a few Hours, communicate all the Virtue they can give to ſeven or eight times their Weight of Water; but after they have had twelve or fourteen Waters poured on them, ſeveral Days muſt paſs before the Water gets all the Strength, which the Lime can give it.

(*b*) *Hedui et Pictones calce uberrimos fecere agros; quæ ſane et oleis, et vitibus utiliſſima reperitur.*

SECT. IV.

Experiments with Lime-water *and some of the* animal Humors.

THE great Power of Lime-water to diſſolve the *Calculus*, being ſufficiently made out in the above Experiments, the next Subject of Inquiry ſeemed to be, How far the Nature of Lime-water would be changed by its being mixed with the Humors of our Body, and conſequently what Probability there was of its carrying its Virtue along with it to the Bladder?

22. I infuſed a Piece of *B*, three Grains, in a Mixture of *Saliva* and Oiſter Lime-water, in the Proportion of one of the former to two and a half of the latter: Its Surface in a few Hours began to turn white; and, upon ſhaking the Glaſs, threw off white Scales; and in two Days warm Digeſtion it was reduced to a Grain and a half.

23. I immerſed another Fragment of *B*, three Grains, in an Ounce of *cyſtick Bile*, and three Ounces of Oiſter Lime-water, which being kept in a moderate Heat forty two Hours, had near one Grain and a half of its Subſtance diſſolved in the Form of thin whitiſh Scales.

[23.] A Piece of *B*, five Grains, being infuſed in one Part Serum of human Blood, and three and a half Parts Oiſter Lime-water, was, after thirty eight Hours warm and ſixteen cold Digeſtion, reduced to three Grains.

24. I

24. I put alſo a Piece of *B*, five Grains, in a Mixture of one Ounce of freſh Urine and three Ounces of Oiſter Lime-water: After digeſting three Days in the ſame Heat with the laſt, its Surface was become all over white, about a Grain of it was diſſolved, and the reſt ſomewhat rotten and friable.

Since, from theſe Experiments, it appears, that the animal Humors have nothing in their Nature peculiarly deſtructive of the diſſolving Quality of Lime-water, we might reaſonably conclude *a priori*, that it ſhould carry its Virtue along with it even to the Bladder, and ſo in time diſſolve the Stone.

SECT. V.

Experiments with Lime-water, *and* fermented Liquors *and* Spirits.

HAVING ſhewn the Probability there is that the animal Fluids will not deſtroy the Virtue of Lime-water, we come next to inquire, How far it may be affected by ſuch Liquors as are moſt commonly made uſe of in this Country.

25. *Claret Wine* deſtroys the Taſte of near double its Quantity of Lime-water, and the Liquor has the Colour of the Wine rather heightened, and the Taſte of Wine and Water; but, upon adding a little more Lime-water, it acquires a blackiſh Colour, not unlike Gun-powder, and begins to diſcover a little of the Taſte of the Lime. The Quantity required to produce this Change of Colour in the Claret

Claret varies according to the Strength of the Lime-water. Having once ſlaked ſome Quick-lime with boiling Lime-water, I found that the Water made in this Way, turned Claret black, when mixed with it in the Proportion of one and a half to one.

I took two Pieces of A, each weighing twenty three Grains: The one being put in Lime-water, and kept in a moderate Heat, in five Days had near five Grains rotten and diſſolved; the other being put in one Part Claret and two Parts of the ſame Lime-water, and kept in the ſame Heat for fifteen Days, loſt nothing of its Weight, nor was its Surface at all ſoftened.

26. An Ounce of Lime-water mixed with an equal Quantity of *ſtrong Ale*, not in any Degree ſtale, having been but fourteen Days in the Bottle, had its Taſte quite deſtroyed, at the ſame time that it weakened the malty Taſte of the Ale more than an equal Quantity of common Water. A Piece of *A*, ten Grains, after lying thirteen Days in this Mixture in a moderate Heat, had loſt nothing of its Weight, nor were there any Signs of Diſſolution about it.

Small Beer has the ſame Effect, but in a leſs Degree.

27. Upon mixing Lime-water and *Vinegar*, there does not ariſe any Effervescence or Ebullition; one Ounce of the latter deſtroys the Taſte of ten or twelve of the former; and a Fragment of *A* that weighed four Grains, after lying eight Days among this ſaturated

Mixture in a digeſting Heat, had loſt nothing, nor was it any way ſoftened.

Hence it ſeems proper for ſuch as uſe Lime-water, to abſtain not only from all Acids, but alſo from Wine, Ale, and, ſo far as I have been able to obſerve, all fermented Liquors. And doubtleſs Mrs. *Stephens*, by ordering her Powder to be taken in a Tea-cupful of White-wine, Cyder, or ſmall Punch, muſt have greatly impaired the Strength of it, and rendered it much leſs effectual (although leſs offenſive to the Stomach) than otherwiſe it would have been.

28. A Spoonful of *Weſt-India Rum* mixed with the ſame Quantity of Lime-water, produces a Liquor of a fine Limon-colour, both taſting and ſmelling ſtrong of the Lime. A little Vinegar added to this, immediately changes its Colour, and deſtroys all Taſte of the Lime.

Rum, in which ſo much *Limon-peel* had been infuſed as to give it a yellow Colour, being mixed with an equal Quantity of Lime-water, acquired a ſtronger yellow Colour; but immediately became turbid; which was owing, I ſuppoſe, to the Change made by the Action of the Lime-water upon that Oil with which the Limon-ſkins abound, and to which the yellow Colour of the Rum was owing.

29. Equal Parts of *French Brandy* and Lime-water produce a Liquor higher-coloured than the Brandy was before, but taſting ſtrong of Lime. In an Hour or two there falls to the Bottom a brown Sediment, (eſpecially

cially if the Brandy was high-coloured), and the Liquor above becomes of a Limon-colour, not taſting of Lime; but when the Sediment is ſtirred up, it taſtes as before.

Much the ſame thing happens to *Malt-ſpirits* and *Rum*, when mixed with Lime-water; and in proportion as theſe Spirits are more or leſs free of Colour, ſo is the Sediment that falls to the Bottom. From this we ſee, that though theſe Spirits do not deſtroy the Taſte of Lime-water, yet they have a Power of making the Lime precipitate in a ſhort time, which, when it falls to the Bottom, carries along with it whatever is mixed with theſe Spirits in order to colour them.

30. Having infuſed a Piece of *B*, two Grains, in one Part *Malt-ſpirits*, and two Parts Oiſter Lime-water; in thirty five Hours warm Digeſtion its Surface was become white, and it had about one third of a Grain of its Subſtance diſſolved.

From theſe Experiments we may conclude, that if ſuch Perſons as drink Lime-water, cannot confine themſelves to watery Liquors, it will be ſafer to allow them a little weak Punch made without Acids than Wine, Ale, or any fermented Liquors.

SECT. VI.

Experiments with Lime-water *and* animal Food, *alſo* Milk, Honey *and* Sugar.

31. I put a Piece of *B*, ſix Grains, in a Mixture of one Part *Mutton-broth* and two Parts Oiſter Lime-water, which, after three Days warm Digeſtion, had two Grains of its Subſtance diſſolved.

32. At the ſame time having added half an Ounce of a ſtrong Decoction of freſh *Cod-fiſh* to an Ounce and a half of Oiſter Lime-water, I immerſed in it a Fragment of *B*, four Grains, which in the ſame Heat was in three Days and twelve Hours reduced to one Grain.

Hence we may conclude, that animal Food may be allowed to ſuch as are under a Courſe of Lime-water for the Stone.

33. A Fragment of *B*, near five Grains, being put in a Mixture of one Ounce of *Milk* and four Ounces of Oiſter Lime-water, after digeſting forty two Hours in a Heat rather greater than that of the human Body, had ſome of its Subſtance diſſolved under the Appearance of white Scales, and the greateſt Part of it was become rotten, ſo as to crumble down upon preſſing it with one's Nails.

34. Having diſſolved two Drams of *Honey* in three Ounces of Oiſter Lime-water, I digeſted in it a Piece of *B*, five Grains, fifty ſix Hours in a moderate Heat; it loſt only one

one Grain of its Weight, and what remained was as hard as ever.

35. I immerſed a Piece of *B*, five Grains, in three Ounces of Oiſter Lime-water, in which was diſſolved two Drams of white *Sugar*; in forty eight Hours warm Digeſtion, it was reduced to three Grains; and what remained did not ſeem quite ſo hard.

Thus it appears, that *Honey* deſtroys in a good meaſure the diſſolving Virtue of Lime-water, while the ſame Quantity of *Sugar* weakens it but very little. As in mixing Lime-water and Honey together, a pretty diſagreeable Smell ariſes, they ſeem to ſuffer ſome Change in their Nature, by which the Virtue of the Lime-water is much weakened. This may be alſo in part occaſioned by the active Particles of the Lime-water being inviſcated and ſheathed by the balſamick Parts of the Honey.

SECT. VII.

Experiments with Lime-water *and ſeveral* Fruits, Herbs *and* Roots.

THAT ſuch a Diet may be ordered for calculous Patients as will leaſt deſtroy the Virtue of Lime-water; after the Experiments upon animal Food, we ſhall relate the Effects of different vegetable Subſtances upon it.

36. I infuſed a Fragment of *B*, eight Grains, in half an Ounce of Juice of *Strawberries*, and two Ounces and an half of Oiſter Lime-water; after four Days warm Digeſtion, and ſeven

Days cold, it had loſt none of its Weight, nor was there any Appearance of Diſſolution about it.

37. I digeſted a Piece of *B*, ſix Grains, in half an Ounce of Juice of *Cherries* and three Ounces of Oiſter Lime-water, ſix Days warm; but its Surface was neither ſoftened, nor its Weight diminiſhed.

38. A Fragment of *B*, ſix Grains, being put in a Mixture of one Ounce of a ſtrong Decoction of *Raiſins* and three Ounces of Oiſter Lime-water, was not any way changed by three Days warm Digeſtion.

From theſe Experiments we may infer, that all Fruits which have any Acidity or Sharpneſs, whether freſh, as Gooſeberries, Strawberries, Cherries, Apples, Pears, Plumbs, Peaches, *&c.* or dried, as Raiſins, Prunes, Currants, *&c.* ought to be abſtained from by ſuch as uſe Lime-water with a View to the Diſſolution of the Stone.

39. I infuſed a Fragment of *B*, five Grains, in one Ounce of a Decoction of *Aſparagus* and two Ounces of Oiſter Lime-water; in few Hours its Surface began to turn white, and, in thirty ſix Hours warm Digeſtion, it had thrown off, in white Scales, a full Grain of its Weight. As the groſſer Parts of the Aſparagus fell always to the Bottom of the Glaſs, it was neceſſary to keep the *Calculus* ſuſpended in the Middle of the Mixture, by means of a Thread, otherwiſe the Diſſolution does not ſucceed quite ſo well.

Artichokes ſeem to deſtroy the Virtue of Lime-water a little more than *Aſparagus*.

40. A

40. A Piece of *B*, nine Grains, by digesting warm, four Days, in one Ounce of a Decoction of *Turnip*, and two Ounces of Oister Lime-water, lost more than a Grain.

41. A Fragment of *B*, three Grains, being put into a Mixture of a Decoction of *Parsley* and Lime-water, in the above Proportion; in three Days warm Digestion was reduced to one and one fourth Grain, having thrown off the rest in whitish Scales.

42. In an Ounce of Decoction of *Onions*, and two Ounces of Oister Lime-water, a Piece of *B*, of seven Grains, lost, by thirty six Hours warm Digestion, one Grain.

43. Juice of *Lettuce* mixed with Lime-water destroys its Virtues rather more than any of the above.

44. A Fragment of *B*, nine Grains, in *Unc.* i. of a strong Decoction of *Althea Root*, and two Ounces of Oister Lime-water, had, by two Days and eighteen Hours warm Digestion, above a Grain of its Substance dissolved, and a good Part of the rest rotten and friable.

45. I put a Piece of *B*, fourteen Grains, in Oister Lime-water, in which some *Juniper-berries* had been infused; which, in two Days and a half, had above two Grains dissolved.

Green and *Bohea Tea* infused in the same Manner do not considerably destroy the Virtue of Lime-water.

I might have tried the Effect of a great many more vegetable Substances upon Lime-water, had I not been afraid of swelling this

Paper

Paper to too great a Bulk; but, from theſe few Experiments, it is probable, that moſt of the following Vegetables may be ſafely uſed by ſuch as drink Lime-water, *viz.* Artichokes, Aſparagus, Spinnach, Lettuce, Succory, Parſley, Purſlane, Onions, Leeks, Cellary, Turnip, Carrot, Potatoes, Radiſhes, Green Peaſe (*c*).

SECT. VIII.

Experiments with Lime-water *and ſeveral* Medicines

46. HAVING diſſolved *Tartar ſolubilis drach.* i. in Lime-water *Unc.* i. *ſem.* I put in it a Piece of *B*, four Grains, which, though kept in warm Digeſtion five Days and a half, had not loſt any thing of its Weight, but was become ſomewhat more friable.

47. I digeſted a Piece of the ſame *Calculus* of four Grains in a Solution of *Nitre* in Oiſter Lime-water, in the above Proportion, which, in five Days and twelve Hours, had near one Grain of its Subſtance diſſolved.

48. Having immerſed a Fragment of *B*, ſeven Grains, in Oiſter Lime-water *Unc.* iii. *Sal Cathart. amar. drach.* i.; after near four Days warm Digeſtion, the *Calculus* had ſcarcely

(*c*) The Juices and Decoctions of *Onions*, *Leeks*, and *Cellary*, are obſerved to have a very conſiderable Power of diſſolving the ſofter kind of Gravel ſtones; and therefore ought to be preferred to moſt other Vegetables for the Diet of calculous Perſons. Vide *Hales*'s Staticks, Vol. 2. and *Ratty*'s Experiments on Mrs. *Stephens*'s Medicines.

ly loſt any of its Weight, but its external Surface was ſofter, and ſomewhat rotten.

49. At the ſame time I put a Piece of *B*, ſix Grains, in Oiſter Lime-water *Unc.* ii. in which was diſſolved *Sal Glauber ſcrup.* ii.; after being kept near four Days in a moderate Heat, its Surface was rather more rotten than the *Calculus* in the laſt Experiment, but it had loſt none of its Weight.

50. A Piece of *B*, ſix Grains, by digeſting warm in Oiſter Lime-water *Unc.* iii. *Sea Salt drach.* i. betwixt three and four Days, had a Grain of its Weight diſſolved.

Lime-water does not remarkably diſſolve moſt of the above Salts, for the greateſt Part of them, after ſtanding a little, falls to the Bottom; upon which account I kept the *Calculus* in theſe Experiments ſuſpended in the Middle of the Phial by a Thread.

Hence we ſee, that Salts, even thoſe of the neutral Kind, deſtroy conſiderably the Virtue of Lime-water.

51. I put a Piece of *B*, four Grains, in a Solution of ſeven Grains of *Aloes*, in Oiſter Lime-water *Unc.* ii.; which, by thirty ſix Hours warm Digeſtion, was reduced to about three Grains.

52. I infuſed *Pulv. Rhæi gr.* x. in Oiſter Lime-water *Unc.* iii. for twelve Hours; after which I immerſed in it a Piece of *B*, ſix Grains; in thirty two Hours warm Digeſtion, near two Grains of it were rotten and diſſolved.

It is obſervable that Lime-water, mixed with Powder of Rhubarb, immediately acquires

quires a deep red Colour, as if Cochineal had been infuſed in it; and the ſame thing happens when an Infuſion of Rhubarb is mixed with ſtale Urine or Potaſh; whence we may ſee why the Urine of a Perſon who has taken Rhubarb acquires a bloody Colour if it remains but ever ſo ſhort a time in a Pot, which is cruſted with the Sediment of ſtale Urine. A *Phænomenon* which, doubtleſs has diſcompoſed not a few who were ignorant of its true Cauſe.

53. Having infuſed in the ſame Manner *Pulv. Jalap. gr.* x. in Oiſter Lime-water *Unc.* iii. I put in a Fragment of *B*, ſix Grains, which, by digeſting warm thirty two Hours, was reduced to five Grains.

54. A Piece of *B*, four and a half Grains, being for thirty four Hours digeſted warm, in an Infuſion of *Senna drach. ſem.* in Oiſter Lime-water *Unc.* iii. loſt one Grain.

55. Having diſſolved *Manna ſerup.* ii. in Oiſter Lime-water *Unc.* ii. I immerſed in it a Piece of *B*, four and a half Grains; which, by being kept thirty four Hours in a moderate Heat, had above a Grain of its Subſtance rotten and diſſolved.

From theſe Experiments we ſee, that if, by drinking Lime-water, the Body ſhould be rendered coſtive, which (eſpecially if no Soap is taken along with it) may ſometimes be the Caſe, it will be better to uſe ſome of the laſt mentioned Purgatives, than any of the Salts in the Beginning of this Section.

SECT.

SECT. IX.

Experiments ſhewing the Change made on Lime-water *by boiling, and being expoſed to the open Air, with further Obſervations on its Nature and Uſe in ſeveral Diſeaſes.*

HAVING in the above Sections made a Variety of Experiments with Lime-water upon different Subſtances, it ſeemed next very proper to try what Alteration would happen to it from boiling, or expoſing it to the open Air, and to inquire wherein its Virtue conſiſts.

56. Twelve Ounces of Lime-water being boiled pretty quickly into four, had loſt ſome of its Virtue; for whereas, before boiling, a blackiſh Colour was produced by two Parts of it to one of Claret, now it required near two and a half.

57. If a Bottle be filled with Lime-water, and cloſely ſtopt, it will keep, for a long time, without ſuffering the leaſt Change, or loſing any of its Virtues: But, having expoſed four Ounces of it in an open Veſſel, it began very ſoon to throw up a Scum, and let fall ſome Sediment of the ſame Nature; in three Days it had loſt moſt of its fiery Taſte, and ceaſed to turn Claret blackiſh; and in five Days, when the Taſte of the Lime was almoſt quite gone, it neither changed the Colour of Syrup of Violets, nor had any Effect in diſſolving the Stone. And this happens equally ſoon, when placed in the cold Air, as in a moderate Heat; but depends a great deal upon the Narrowneſs

Narrowneſs or Wideneſs of the Veſſel: For it will be found, that the Time in which Lime-water, thus expoſed, loſes its Virtue, will be more or leſs, according to the Proportion which the Surface bears to the Quantity of the Fluid.

Since Lime-water, when thus expoſed, continues to change the Colour of Syrup of Violets near two Days after it has ceaſed to have any Effect upon Claret, this laſt ſeems to be the ſevereſt Teſt of its Goodneſs.

The Scum which Lime-water, expoſed to the Air, throws up, is at firſt an extremely thin Pellicle, exhibiting various Colours like a Rainbow, or Soap Bubble; theſe Colours, however, gradually change, till, by the conſtant Appoſition of new Particles, the Scum becomes thick enough to reflect all the Rays of Light equally, and ſo appear white.

This icy Scum or Cruſt which Lime-water affords, being well beat, and mixed with Syrup of Violets, and then ſome common Water added to it, the Mixture after a little ſtanding acquires a green Colour. Hence at firſt Sight it would ſeem probable, that ſome Part of the Virtue of Lime-water conſiſts in this Scum; the Parts of which are ſo minutely divided, and intimately mixed with the Water in its Ebullition with the Quick-lime, as to be abſolutely inviſible, and to remain inſeparable from it, as long as it is kept in a cloſe Veſſel. Why they ſhould immediately begin to ſeparate from the Water, and unite together when expoſed to the open Air, may perhaps not be eaſy to account for: Poſſibly

ſome

ſome very active fiery Parts may thus be allowed to fly off from the Lime-water, which before hindered the Union of thoſe earthy Particles, of which this Scum is compoſed.

Here it may be worth while to obſerve a conſiderable Analogy between ſome Mineral Waters and Lime-water. Chalybeat Waters are, when expoſed to the Air, obſerved ſoon to let fall a yellow Ocre, and loſe their Virtues; and Lime-water expoſed in the ſame Manner ſoon throws up an earthy Scum, and becomes effete. — Lime-water, boiled in open Veſſels, or diſtilled in cloſe ones, loſes a good deal of its Strength; and the ſame thing is ſtill more remarkable in Mineral Waters.

It has been a common Opinion, that while the martial Spirit (as it is called) remains in Chalybeat Waters, their metallick Particles continue inviſible, but that no ſooner does this Spirit fly off, than theſe Particles begin to unite and ſhew themſelves in the Form of a yellow Ocre. And is it not probable that when Lime-water is expoſed to the Air, it ſoon becomes deprived of ſome active volatile Matter, which kept its earthy Particles from uniting, and to which its Virtues were in a great meaſure owing? The ſubtile Matter, however, or Spirit of Mineral Waters, is not ſo eaſily hindered from flying off as that of Lime-water, ſince the cloſeſt ſtopt Bottles do not prevent its Eſcape, if the ſmalleſt Quantity of Air is left between the Water and the Stopper. But to return,

The calcarious Matter which ſeparates from Lime-water upon its being expoſed to the

Air, can by no Art be again diſſolved in Water, or intimately united with its Particles, but perpetually falls to the Bottom, in the Form of a white Powder; which is altogether inſipid, and void of Taſte. And upon this account, I ſuppoſe, it has generally been looked upon as a fine ſlaked Lime; though, from the following Experiments, it will appear, that it differs both from ſlaked and unſlaked Lime.

(1.) Calcined Shells freſh from the Fire, make but a ſmall Ebullition with Vinegar, and ſend forth a diſagreeable ſulphureous Smell.

(2.) Calcined Shells that had lain in Water till they were thoroughly ſlaked, when dried, and reduced to a Powder, did not effervеſce with Vinegar at all.

(3.) The calcarious Matter afforded by Lime-water upon Evaporation, being mixed with Vinegar, a ſtrong Ebullition enſues, which laſts for a conſiderable Time.

(4.) I put a ſmall Quantity of this Powder of Lime-water in a Silver Spoon, and kept it over a pretty briſk Fire for fifteen Minutes; but, after it was taken from the Fire, and cooled, it raiſed the ſame Effervеſcence with Vinegar as before.

(5.) I poured boiling Water once and again upon ſome of this calcarious Matter, to ſee if, by repeated *Affuſions* of the Water, it would loſe any thing; but, after the Water was drained off, and the Powder moderately dried, it efferveſced with Vinegar equally as before.

Hence the Ebullition which the calcarious Matter

Matter of Lime-water makes with Acids, ſeems neither to be owing to a volatile nor fixed alcaline Salt; for a volatile Salt would have been expelled by the Fire, and either a fixed or volatile one diſſolved by repeated *Affuſions* of boiling Water.

(6.) Powdered Chalk makes a conſiderable and laſting Ebullition with Vinegar, in the ſame manner as the Scum of Lime-water, and continues to do ſo, after repeated *Affuſions* of boiling Water, or being expoſed to the Heat of a briſk Fire.

Hence the calcarious Matter afforded by Lime-water ſeems to be a true *alcali terreux*, like Chalk, and its Effervеſcence with Acids to be owing to this alone.

(7.) Although Quick-lime makes but an inconſiderable Ebullition with Vinegar, and ſlaked Lime none at all, while the calcarious Matter of Lime-water makes a ſtrong and laſting one; yet all three raiſe a prodigious Effervеſcence when mixed with the ſtronger Acids, as Spirit of Nitre, or Spirit of Sea-ſalt. Hence all of them ſeem to contain a good deal of the *alcali terreux*, although this is ſtrongeſt in the Scum of Lime-water.

Dr. *Langriſh* has found, that an *Engliſh* Pint of ſtrong Stone Lime-water, made by pouring the Water three different times upon Quick-lime, afforded, upon Evaporation, ſixteen Grains of a calcarious Subſtance *(d)*. Now, if we ſuppoſe this Lime-water to have exceeded in Strength, our Stone Lime-water,

(d) Phyſical Exper. on Brutes, p. 11.

mentioned N° 21. above, in the ſame Proportion as the double Oiſter-ſhell Lime-water B exceeded A, which was made by pouring the Water only once upon the calcined Shells (*e*), its ſpecifick Gravity muſt have been to that of Water, as 286 to 285. Hence, ſuppoſing an *Engliſh* Pint of Spring-water to weigh exactly one Pound Apothecaries Weight, the ſame Quantity of Dr. *Langriſh*'s ſtrong Lime-water would have weighed one Pound and $27\frac{1}{2}$ Grains; wherefore there muſt have evaporated, along with the aqueous Particles of this Lime-water, $11\frac{1}{2}$ Grains of ſome ſubtile Matter, to which its ſuperior Gravity is in part to be aſcribed, and to which its Power of diſſolving the Stone ſeems chiefly to be owing; ſince the calcarious Scum and Sediment can have little, if any, Virtue this way. This ſubtile active Matter, by Diſtillation as well as Evaporation, flies off from the Water, ſo as not to unite with it again, and ſeems to evaniſh, or eſcape through the luting or perhaps even the Pores of the Veſſels; for Dr. *Langriſh*, upon diſtilling a Pint of Lime-water from two Quarts, found, that both the diſtilled Water in the Receiver, and what remained in the Retort, were impaired in their Virtue.

58. Lime-water, when mixed with Vinegar, in the Proportion of ten to one, does not throw up any Scum; but when it has all evaporated in a moderate Heat, leaves a dark-coloured Sediment; which ſeems however chiefly to ariſe from the Vinegar.

59. It

(*e*) Vid Sect 3. No. 21. above.

59. It has generally been thought, that no Salt could be got from Lime-water; nor could I by evaporating it ever procure any; the Scum left behind having rather the Appearance of a fine Lime, or abſorbent Earth. If it be ſaid, the Salt in Lime-water is of the volatile kind, and therefore not to be got by Evaporation, it may be ſufficient to anſwer, that, then, this volatile Salt which ſhould in ſome Degree affect our Smell, ought to be procured by diſtilling Lime-water in cloſe Veſſels: But it is ſo far from being true, that there is any volatile Salt in Lime-water, that the Vapour which riſes from Water, during its Ebullition with Quicklime, is entirely devoid of the Virtues of Lime, and ſcarcely differs from Common-water. Yet, upon adding one Part White-wine Vinegar to ten or twelve Parts Stone Lime-water, after ſome Days, I perceived ſome ſaline Concretions adhering to the Sides of the Glaſs: Theſe taſted not unlike Sea-ſalt, but ſweeter, and, no doubt, proceeded from the acid Salt of the Vinegar rendered neutral by the Lime-water: Having infuſed a Fragment of *B* in ſome Oiſter Lime-water, made with Shells that had lain fifteen Hours after being taken from the Fire, I was ſurpriſed to obſerve, in three or four Days, a prodigious Number of ſmall-pointed Cryſtalliſations, like fine Needles, about the ſixth Part of an Inch long, darting as it were into its Surface, and giving it ſomewhat the Appearance of a Hedgehog. But I am apt to think, that theſe did not proceed from the Lime-water, but the Sea-ſalt, with which the Oiſter-ſhells, even after Calcination, ſo much

abound (*f*). And accordingly I have ſince often obſerved the ſame ſaline Cryſtalliſations, tho' not ſo remarkable, produced by Lime-water made with Oiſter-ſhells newly got from the Sea; although as far as I remember, never from Stone Lime-water, nor that made with calcined Shells, which, by being long expoſed to the Weather, had been entirely deprived of their Sea-ſalt. We are told indeed, that Mr. *Lewenhoeck* diſcovered, by his Microſcopes, in Lime-water, a great Number of ſaline rigid Particles (*g*). But whether his Imagination aſſiſted him herein, or whether he did not rather want to diſcover a Similitude betwixt this Water and that got off burnt *calculi*, and the tophaceous Matter which ſometimes iſſues from the Joints of gouty Perſons; or whether there really are ſuch ſaline Particles; I will not take upon me to determine: For altho' it has been the general Opinion of the moſt eminent Chymiſts, that no Salt could be procured from Quick-lime; yet, of late, Mr. *Du Fay* pretends to have extracted a Salt from Lime-water, and has given an Account at large of the Way in which this may be done (*h*). But, ſince his Salt is of the neutral kind, and does not ſeem to be poſſeſſed of any remarkable Virtues; and ſince he obſerves, that, unleſs the Lime-ſtone is put red hot into the Water, and boiled with it, and its Water poured out while it is yet boiling in order for Evaporation,

(*f*) See No. 67. below.
(*g*) Muſgrave de Arthritide, cap. ix. § 4.
(*h*) Memoires de l'Acad. des Sciences 1724.

Evaporation, it either affords no Salt at all, or very little; we may ſafely conclude, that the Virtue of Lime-water does not lie in this Salt. And as the calcarious Subſtance which, upon Evaporation, it depoſites, has little Efficacy, and ſeems ſcarcely any thing different from a mere abſorbent alcaline Earth, it remains, that the diſſolving Virtue of Lime-water is owing to ſome very active penetrating ſubtile Matter, which the Water, during its Ebullition with the Quick-lime, is impregnated with, and to which the Increaſe of its ſpecifick Gravity is partly to be aſcribed; but which, upon Lime-water's being expoſed to the Air, ſoon flies off, and leaves it effete.

60. Altho' Lime-water changes the blue Colour of Syrup of Violets into green, and affords an alcaline abſorbent Earth, which effervesces with, and deſtroys Acids; yet as the Water itſelf does not effervesce with Vinegar or Spirit of Vitriol, it ſeems to partake but little of an alcaline Nature. Nor do the Virtues of Quick-lime conſiſt in an *Alcali:* For Quick-lime effervesces much leſs with Vinegar than with Small-beer, and is very difficultly ſlaked by either; while Water, which is neither acid nor *alcali*, being poured upon it, produces great Ebullition and Heat, and quickly diſſolves it. And altho' Quick-lime makes a great Ebullition with the ſtronger Acids, as Spirit of Vitriol, Nitre, and Sea-ſalt; yet this ariſes from the terreſtrious *Alcali* which it contains in common with ſlaked Lime, the Scum of Lime-water, and the other Abſorbents, and not from any particular Salt of that Nature.

Nature. Nor is the Activity and corroſive Power of Quick-lime owing to its alcaline Nature; ſince the calcarious Matter of Lime-water, which is inſipid, and altogether void of the peculiar Taſte of the Lime, makes a greater Effervescence with Vinegar than it, and ſince Mr. *Homberg* has obſerved that ſlaked Lime requires as much Spirit of Nitre, or Sea-ſalt to ſaturate it as Quick-lime (*i*).

The drinking of Lime-water does not render the Urine alcaline; for Mr. *Millar*'s Urine neither effervesced with Vinegar, nor turned Syrup of Violets green; altho' he alledged he could perceive the Taſte of the Lime-water in it. Nor does Quick-lime itſelf change any of the Humors of our Body into an alcaline Nature. Upon adding it indeed to Urine, a fiery pungent Vapour ariſes; which, however, is not properly alcaline; for being mixed with Acids, no Effervescence enſues, though its fiery Nature and Volatility are greatly diminiſhed by them. Nor has any Art yet been able to procure from this Spirit the ſmalleſt Quantity of Alcaline, or indeed of any other Salt (*k*).

From this it is evident, that the ſtrong-ſcented alcaline Urine voided by ſuch Perſons as have taken Mrs. *Stephens*'s Medicines, is not ſo much owing to the Lime in them, as to the alcaline Salt or Potaſh, which makes up ſo conſiderable a Part of the Soap. And the diſſolving Virtue of ſuch Urine does not ſeem to

(*i*) Memoires de l'Acad. des Sciences an. 1700.
(*k*) Boerhaave Chemia, Vol. 2. Proceſ. 97.

to conſiſt (as Dr. *Kirkpatrick* and the *French* Academiſts think (*l*) in its alcaline Nature; ſince we find in Mr. *Millar*'s Urine this Power without that Quality; and ſince Dr. *Hales* has ſhown, that the Potaſh, which is almoſt the only alcaline Ingredient in theſe Medicines, has little Effect in diſſolving the Stone (*m*).

Altho' Quick-lime appears, by its Effects, to have a very conſiderable Affinity with fixed alcaline Salts, yet in many reſpects it differs from them; and there are not wanting Experiments which ſeem to indicate an acid Quality in it. Hence ſeveral chymical Writers have been of opinion, that Quick-lime contained both an acid and a fixed alcaline Salt, and to the Conflict between theſe oppoſite Salts they have aſcribed the Ebullition and Heat which is produced when Quick-lime is diſſolved by pouring Water upon it (*n*). Nor is it any Wonder, ſay they, that, by the Affuſion of Water, no Salt is got from Quick-lime, becauſe its two oppoſite Salts are, by acting on each other, deſtroyed, and turned into a third Subſtance, which, like all Magiſteries, is inſipid, and not diſſolvable in Water (*o*).

Lime-water being mixed with Salt of Tartar, immediately becomes turbid and whitiſh, and after ſome time lets fall a white inſipid Powder; which is not a vitriolated Tartar, as Mr. *Malouin* alledges, (*p*) but greatly reſembles

(*l*) Kirkpatrick's Caſe, and *Memoires de l'Acad. des ſciences, an.* 1739 & 1740.

(*m*) See below, No. 62.

(*n*) Mayow oper. cap. 14. de æſtu calcis vivæ.

(*o*) Idem. ibid.

(*p*) Macquer elemens de chymie theorique p. 67.

bles prepared Oiſter or Egg Shells; for it is an abſorbent alcaline Earth which effervesces ſtrongly with Vinegar and Spirit of Vitriol, but is not diſſolved by the latter. If ten Grains of Salt of Tartar are added to three Ounces and a half of Lime-water, after the above mentioned Powder has precipitated, the Water has a bitter Taſte from the alcaline Salt; but when an Ounce and a half more of the Lime-water is added, the Liquor becomes much leſs bitter, and gets a good deal of the Taſte of Lime-water.

When Lime-water deſtroys Acids, we readily aſcribe this Effect to the alcaline Earth which it contains: But to what Principle in Lime or Lime-water are we to refer the Precipitation which happens upon the Mixture of Lime-water with a fixed alcaline Salt? Does it ſhew that there is an Acid in Lime-water? that this Acid is united cloſely with an alcaline Earth, which it keeps inviſibly ſuſpended in the Water; but that being ſtrongly attracted by the fixed alcaline Salt, it leaves this Earth, which then precipitates in the Form of a white Powder? Are we to aſcribe it to this Acid, that Spirit of *Sal ammon.* diſtilled with Quick-lime, has its Nature ſo changed, as not to effervesce with Acids? Does it ſeem probable that certain Stones and animal Shells are, by Calcination, changed into Quick-lime, becauſe, as alcaline Earths, they are peculiarly qualified to receive and unite with this Acid? And may we conclude from the above Experiment, that the active Properties of Quick-lime are owing to

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an alcaline Earth heightened, perhaps, by the Fire, and united with a ſubtile acid Spirit? Whoever ſhould anſwer theſe Queries in the Affirmative, would be greatly too haſty in his Concluſions; for the following Experiment will ſhew, that though fixed alcaline Salts render Lime-water turbid, and cauſe a Precipitation, yet their alcaline Quality is no way deſtroyed by it.

Having added forty Grains of Salt of Tartar to twenty Ounces of ſtrong Stone Lime-water, after ſome Hours, I poured off the clear Water, and boiled it into three Ounces and a half; when it effervеſced ſtrongly, both with Vinegar and Spirit of Vitriol. Further, if there was an Acid in Quick-lime, would a Solution of Potaſh have its pungent corroſive Qualities greatly heightened by being poured upon it? Ought not rather its alcaline Nature to be thence greatly impaired or deſtroyed?

Mr. *Geoffroy* thinks, that there is in Quick-lime a fixed alcaline Salt, formed of the aluminous vitriolick or nitrous Acid of the Stone, and of the Acid in the Wood or Coals *(q)*. This Salt he imagines to be, like the fixed *alcali*, united with Flint and Sand in making Glaſs, ſo intimately conjoined with the earthy Parts of the Lime, as not to be ſeparable from it by any Affuſion of Water. But if this be ſo, it muſt be allowed that Lime-water cannot owe its Virtues to this Salt; nor by Conſequence Lime itſelf, whoſe Virtues are of the ſame

(*q*) Memoires de l'Acad. des Sciences 1720, Edit. 8vo, p. 28.

ſame kind, tho' vaſtly ſtronger. If it be ſaid that Lime-water contains ſome of the finer Parts of the Lime, to which its Virtues are owing; we anſwer, that as the calcarious Matter which Lime-water affords, is a mere alcaline Earth, the ſuppoſed Salt muſt have left it, and conſequently cannot be ſo inſeparably united with the earthy Parts of the Lime, as is ſuppoſed. Further, as Quick-lime, after being rendered almoſt inſipid by frequent Affuſions of Water, acquires its former Properties, by a new Calcination (*r*), it evidently follows, that no peculiar Salts are required in animal Shells, Stones, or Chalk, in order to their being changed into Quick-lime by Calcination.

Nay, if Lime-ſtone be, before Calcination, impregnated with alcaline, acid, or neutral Salts, it will not, by being burnt in the moſt intenſe Fire, acquire the Properties of Quick-lime (*s*).

Since, then, there does not appear any good Reaſon to aſcribe the Virtues of Quick-lime or Lime-water to any acid or alcaline Salts; it may be aſked, what is the Nature of Quick-lime, and whence do its active Qualities proceed? To which I anſwer, that it is an alcaline Earth, which acquires, by Calcination, highly acrid, penetrating, and igneous Properties; and that, as the neutral Salts of many Vegetables are, by the Action of the Fire, converted

(*r*) Memoires de l' Acad. des Sciences 1700, Edit. 8vo, p. 160; et Macquer elemens de chymie. theorique p. 66.
(*s*) Macquer elemens de chymie theorique, p. 68, &c.

verted into a fixed alcaline Nature, ſo the earthy Matter of animal Shells, and certain Stones, is, by burning, changed into an active fiery Subſtance, which, however it may agree, in ſome Things, with theſe Salts, differs from them in many Reſpects, and is of a Nature peculiar to itſelf.

Whether the active Properties of Quick-lime are owing to the Element of Fire, being cloſely united with, and as it were concentrated in its earthy Matter; or whether they are not rather to be aſcribed to ſome new Change made on this Matter by the Action of Fire, I ſhall not pretend to determine: Only, as Air is attracted by the Bodies of Animals and Vegetables in conſiderable Quantities, and deprived of its Elaſticity, while intimately united with their minute Parts *(t)*: So, may not the Particles of Fire be received into Lime-ſtone and Shells, while they are calcining; and there remain, as it were, fixed and unactive, till they are ſet looſe by the Diſſolution of the Parts of the Lime, upon the Affuſion of Water *(u)* or ſome other *Menſtruum?*

(t) Hale's Statical Eſſays, Vol. I. Chap. vi.

(u) This was Doctor *Willis*'s Opinion, who thence explained the Ebullition, which happens when Water is poured on Quick-lime; but it muſt be owned that, for ought we know, this Ebullition may be, in a great meaſure, owing to the entire Expulſion of all Humidity out of the Lime-ſtone and Shells by Calcination; for when boiling Water is poured on Coffee-beans, freſh burnt and ground, a like Ebullition enſues; which, however, can with

All acid and aceſcent Liquors as Vinegar, Wine, &c. ſeem to deſtroy the Virtues of Lime-water, not merely by depriving it of the ſmall Degrees of *Alcali* it poſſeſſes; for as Dr. *Hales* has found ſeveral Bodies remarkable for abſorbing or deſtroying elaſtick Air, ſo it is not unreaſonable to ſuppoſe, that there may be others, which have the ſame Effect upon Fire; and that acid and aceſcent Liquors which are potentially cold, have it moſt remarkably.

61. From the great Affinity which has been generally ſuppoſed, by Medical Writers, betwixt the Gout and Gravel, it might perhaps be worth while to try the Effects of Lime-water in this Diſeaſe alſo. And the learned Dr. *Cheyne* having aſſerted, that the gouty Chalk-ſtones and Gravel Stones were, as to all their eſſential Qualities, the ſame, and that they yielded both the ſame Principles, when chymically treated (*x*), I procured ſome of them, and infuſed them in Lime-water. At firſt, being ſpecifically lighter than the Water, they ſwimmed. But, after emitting a great Quantity of Air-bubbles, they ſoon fell to the Bottom, and, in a Day or two, were become as ſoft as Butter. But, having afterwards infuſed a Piece of this gouty Matter in Common-water, I found preciſely the ſame Effects from it as from the Lime-water: So that

with no Colour of Reaſon, be aſcribed to any concentrated Fire; and the ſame thing is true of the violent Ebullition and Heat, that are occaſioned by the Mixture of Water and Oil of Vitriol.

(*x*) Cheyne on the Gout, p. 72. Edit. 4

that whatever Probability there may be of Lime-water doing Service to gouty People, from the ſuppoſed Affinity betwixt it and the Gravel, yet nothing can be drawn from this Experiment. However, Lime-water promiſes to do as much, as an Alterative, in ſeveral chronical Diſeaſes, as many other Medicines. It may be taken in large Quantities, and be long perſiſted in. Its Parts are ſo ſubtile, that they can penetrate, at leaſt, where-ever Water can go (*y*); and, conſequently, muſt paſs through the ſmalleſt Veſſels in the human Body. When mixed with the Blood or Urine, it ſeems to exalt their Salts and Oils, and upon the Solids it acts partly as an Aſtringent. Hence it ought to be of uſe where the Blood is watery, ſluggiſh, viſcid, and unactive, and the Solids weak or relaxed. In the *Fluor Albus* and *Diabetes* its Virtues are conſpicuous; and it promiſes to do more in the *Scrophula* than moſt Medicines. In *Diarrhœas* and Dyſenteries from Acidities in the *Primæ Viæ*, and in Excoriations, or Ulcerations of the Guts, it is an excellent Remedy. From its penetrating, diſſolving (*z*) and detergent Qualities, there is Reaſon to expect Benefit from its Uſe in chronick Rheumatiſms, the *Sciatica* and other Obſtructions in the ſmaller Veſſels. I have been told of its having had good Effects in low nervous Fevers: But in

 ardent

(*y*) See No. 57, above.

(*z*) Lime-water mixed with Blood, not only preſerves it in a fluid State, but diſſolves it when newly coagulated.

ardent and putrid Fevers it ought to be hurtful, on account of its Power of volatiſing the Salts, and corrupting the Oils of the animal Humours. In the Scurvy it ſometimes proves a ſovereign Remedy, at other times fails. I once cured a wet ſcorbutick Eruption on the Hands, after a mercurial Salivation had been found ineffectual, by cauſing the Patient drink above an *Engliſh* Pint of Oiſter-ſhell Lime-water every Day for two Months, and now and then waſh her Hands with it.

SECT. X.

Experiments with Lime-water, Soap-leys, Soap, *&c.*

It appearing from Dr. *Hales*'s Experiments, that Soap is poſſeſſed of a conſiderable Power of diſſolving the Stone, and that this is chiefly owing to the Lime that enters into its Compoſition, I was excited to make ſome Experiments upon it, with a View ſtill further to diſcover wherein its Virtue lay, and what Proportion it bears to that of Lime-water; whether Lime-water might not be improved by it; and how far their lithontriptick Quality is deſtroyed by the ſame Things.

62. Having diſſolved *Potaſh drach.* ii. *ſem.* in boiling Water *Unc.* iv. I put in it a Piece of *A*, weighing nine Grains, which, in fifteen Days warm Digeſtion, loſt very little of its Weight, nor was its Surface ſoftened to any Depth. However, its Subſtance ſeemed to have been rendered more friable; for, upon pouring

pouring boiling Water upon it, it rent in ſeveral Places.

63. I boiled Stone Lime-water *Unc.* xiv. with Potaſh *drach.* v. into *Unc* vi. and having laid a Piece of *A*, of eleven Grains and a half, in it, found, that, after ſtanding twelve Days in a gentle Heat, it had loſt ſeven Grains and a half of its Weight.

64. A Pound and a half of boiling Water, in which an Ounce of Potaſh was diſſolved, being poured on two and a half Ounces of Quick-lime, afforded, after the Ebullition was over, and the Lime had fallen to the Bottom, a very fiery corroſive Liquor; which, if applied to the Tongue, in the ſmalleſt Quantity, was in hazard of bringing off the Skin. A Piece of *A*, ten Grains and a half, was diſſolved in it in fifteen or ſixteen Hours, in a moderate Heat. A *Lixivium* of the ſame kind, which I made afterwards, but which did not ſeem ſo ſtrong, diſſolved a Piece of *B*, three Grains, in twelve Hours; while a Fragment of the ſame *Calculus*, of fourteen Grains, required three Days and ſix Hours of a cold Maceration in *Aqua fortis ſimplex* (*a*) to diſſolve it.

Does not the great diſſolving Power of this *Lixivium* ariſe from its abounding ſo much with the fiery Particles of the Quick-lime, which are ſtrongly attracted by the alcaline Salts of the *Potaſh* (*b*)? And, as Sir *Iſaac*

(*a*) Pharmacop. Edinburgenſ. p. 163.

(*b*) As a Proof of this I have obſerved, that the Strength

Newton has obſerved, that the Particles of Light are moſt ſtrongly attracted by ſulphureous Bodies, ſo does there not ſeem to be a mutual Sympathy or Agreement betwixt alcaline Salts and the Particles of Fire?

Inſtead of an Ounce I diſſolved *drach.* ii. of Potaſh in *lib.* i. *ſem.* of Water, and poured it on Quick-lime as above, thinking that the *Lixivium* thus procured, would be poſſeſſed of a greater Power of diſſolving the Stone than ſimple Lime-water, and at the ſame time not ſo fiery as to be in Danger of deſtroying any Parts of the human Body; but I ſoon found, that any Advantage I expected from the greater lithontriptick Virtue of this *Lixivium*, was more than balanced by the extreme Nauſeouſneſs communicated to it by the alcaline Salt.

[64.] Having found a much greater Power of diſſolving the *Calculus* in Shell than in Stone Lime-water (*c*), I thought it might be worth while to try whether a Ley made with it and Potaſh, would prove a ſtronger Lithontriptick than common Soap-leys. For this Purpoſe I poured two Pounds of boiling Water upon four Ounces of purified Potaſh, and five Ounces of calcined Oiſter-ſhells freſh from the Fire, and let them ſtand twenty four Hours. Then into a Phial-glaſs filled with this Ley, I put a Piece of *B*, thirteen Grains, which, after ten Hours warm Infuſion, was entirely diſſolved. At the ſame time

Strength of it depends in a great meaſure upon the Quick-lime's being well burnt, and quite freſh from the Fire.

(*c*) See above, No. 14–18.

time I put another Piece of *B*, of the ſame Weight, into the common Ley with which they make Soap at *Glaſgow*. After ſixteen Hours warm Infuſion, it was moſtly all diſſolved into a white Powder; and the very ſmall *Nucleus* that remained, was quite rotten, and, when preſſed between one's Fingers, fell down into a white Mucilage.

This Ley, made with Oiſter-ſhell Lime, was neither ſo corroſive nor diſagreeable as the *Glaſgow* Soap-leys; for, when mixed with twelve times its Quantity of Water, it was leſs nauſeous, and not more acrid, than the other diluted with ſixteen Waters. Its ſpecifick Gravity was one twenty fourth Part leſs than that of the common Ley. Notwithſtanding all which, we ſee its diſſolving Power was above one third ſtronger.

Hence, in Caſes where it is thought proper to order Soap-leys for the Cure of the Stone, it plainly appears, that a Ley of Potaſh and Shell-lime is preferable; ſince a larger Quantity of it may be uſed with equal Safety, and ſince it poſſeſſes a much greater diſſolving Power.

While the *Glaſgow* Soap-leys, a Solution of Soap and Lime-water, corrode, and break down the *Calculus* into a white Powder, or rotten Scales, and ſo are, properly ſpeaking, only Lithontriptics, the Ley of Potaſh and Oiſter-ſhell Lime melts down the Stone into an unctuous Subſtance, which is moſtly all ſuſpended in the Pores of the *Menſtruum*; which therefore, like *Aqua fortis*, or Spirit

of

of Nitre, may be properly called a Solvent of the Stone.

When a Fragment of *B* was immerſed in this Ley, it immediately ſent forth from every Part of its Surface ſmall Streams, as it were of an oily Fluid, exhibiting the ſame Appearance in the Ley, as Rum does when mixed with Water. This may be obſerved by holding the Phial in which the *Calculus* and Ley are contained, between one and the Light. And though it is moſt remarkable after the firſt Immerſion, yet it continues, in ſome Degree, for a conſiderable Time.

The *Calculus* immerſed in the *Glaſgow* Ley, did not exhibit any ſuch Appearance, but its Surface quickly became all over white.

To two Ounces of purified Potaſh, and three and a half Ounces of Oiſter-ſhell Lime, I added twelve Ounces of boiling Water. After twenty four Hours I decanted off the Ley, and poured it upon freſh calcined Shells; by which means it acquired a yet ſtronger Virtue of diſſolving the *Calculus*: For a Piece of *B*, thirteen Grains, was, after eight Hours warm Infuſion in it, totally diſſolved. Although this Ley diſſolved the Stone twice as faſt as the *Glaſgow* Soap-leys; yet, mixed with equal Quantities of Water, it was leſs nauſeous, and but very little more pungent.

From theſe Experiments, it is reaſonable to think, that if the *Sapo Amygdalinus* of the *London Diſpenſatory* were made with a Ley of purified Potaſh and Oiſter-ſhell Lime, inſtead of common Soap-leys, it would be full as agreeable

greeable to the Taſte, and poſſeſſed of a greater Power of diſſolving the Stone.

65. A Piece of *A*, of ſeventeen and a half Grains, being put in a Solution of *Alicant* Soap in warm Water, had, after ſix Days warm Digeſtion, a pretty thick white Cruſt all round it ready to fall off; which being removed, the undiſſolved Part weighed fourteen Grains. In nineteen Days it was reduced to ſix Grains.

66. It is not ſo eaſy as one would at firſt think, to account for the diſſolving Virtue of *Alicant* Soap (*d*): For of its three Ingredients, Lime-water, alcaline Salt, and Oil, only the firſt has any conſiderable Power this way, the ſecond having very little, and the third none at all. The firſt and ſecond mixed together, have not more than the firſt alone (*e*); and the ſecond and third united, have none at all: And yet of theſe two laſt, the Soap chiefly conſiſts. Beſides, as Lime-water, when boiled into a Ley with Potaſh, rather loſes than acquires any diſſolving Virtue, it is difficult to give a Reaſon why, after the Addition of ſo much Oil in making Soap, this Virtue ſhould not be ſtill much more weakened. To account for this, it ought to be obſerved, that as in boiling Lime-water a Scum is always left behind; ſo the vaſt Quantity of Lime-water that is added to the alcaline

(*d*) If, as Mr. Lemery affirms, and I have been informed, it is made only of fixed alcaline Salt, Lime-water, and Oil. See p. 158. above.

(*e*) Compare No. 10. 11. and 12. with No. 63. above.

line Salt and Oil in the making of Soap, muſt, when evaporated, leave a great deal of the Scum mixed with the other two Ingredients. And as it is probable, that ſome Part of the Virtue of the Lime-water may remain in this Scum (*f*); ſo, although the watery Humidity in Soap bears but a ſmall Proportion to the other Ingredients (*g*), yet there may be united with them what in ſome Degree contains the Virtues of a very great Quantity of Lime-water. Beſides, I imagine, that the Lime-water uſed in making Soap is ſomewhat turbid, and ſo muſt carry along with it ſome of the groſſer Parts of the Lime; which, uniting with the alcaline Salt, muſt heighten the diſſolving Power of the Soap: And this ſeems to be confirmed by ſmall Bits of Lime, being ſometimes found undiſſolved in Soap. But further, it is probable, that the Lubricity given to the Soap, by means of the Oil, may enable the active Parts of the Lime-water and Potaſh to enter the Pores, and penetrate more eaſily into the Subſtance of the *Calculus*, and thus facilitate its Diſſolution. That I might be more fully ſatisfied of this, I made a Solution of *Alicant* Soap in Stone Lime-water, to ſee whether the Virtue of the Lime-water might not be increaſed by its Mixture with the Soap. Nor was I diſappointed: For I found this to have a greater diſſolving Power than either

(*f*) See No. 57. above.

(*g*) According to Mr. Geoffroy, in 180 lib. of Soap there are only 15 lib. of a watery Humidity. See Memoires de l'acad. des ſciences, *anno* 1739.

either a Solution of Soap in common Water, or Lime-water by itſelf, or even than the Aggregate of the diſſolving Powers of Soap and Lime-water when unmixed: For a Piece of *A*, eighteen Grains, after lying five Days in it in a moderate Heat, was reduced to ſix Grains, ſeveral white Cruſts having fallen off in this Time. Finding it had loſt none of its Weight, and that no further ſenſible Impreſſion was made on its Surface, after ſtanding twenty four Hours longer, and obſerving that the Bottle was not very cloſely corked, I ſuſpected that the Solution had loſt its Virtue, which evidently appeared by its having loſt all Taſte of the Lime-water; I therefore put the *Calculus* in a new Solution, where in three Days it was all diſſolved, except a ſmall *Nucleus* weighing a Grain.

[66.] Another Time, when I made the ſame Experiment, I did not find the Virtue of the Lime-water ſo much increaſed by the Soap: For a Piece of *B*, ten Grains, put into the like Solution, in two Days and nine Hours, only loſt a little more than three Grains; while a Piece of the ſame Weight, in Stone Lime-water alone, loſt in that time two Grains. Whether the Soap in the one Caſe was better than in the other, or whether the due Proportion in mixing them was not hit in this laſt Experiment, I cannot poſitively affirm.

It may be proper to obſerve, that the Lime-water muſt be pretty hot; and the Soap and it muſt be agitated together for a conſiderable Time, otherwiſe they will not unite.

The

The quick Diſſolution of the Stone in the two laſt Experiments, affords a clear Reaſon for the Succeſs which attended the Stone Lime-water in Mr. *Millar*'s Caſe; which we ought to conſider as having had its Efficacy in a good meaſure heightened by its being taken along with a conſiderable Quantity of Soap.

67. Having found the diſſolving Virtue of Oiſter-ſhell Lime-water much greater than that of Stone-lime, I thought a Solution of Soap in it would have a proportionably greater Effect. But here I was ſoon diſappointed: For I found it impoſſible by any Art to make them unite; which ſeems to be owing to the Sea-ſalt that abounds in the Oiſter-ſhells, and which the Fire had not been able entirely to deſtroy. However, as the Cockle-ſhell Lime-water (N° 17.) diſſolved Soap, I ſuſpected, that, if Oiſter-ſhells were long expoſed to the Weather before calcining, the Water procured from them might probably do ſo likewiſe. Accordingly having got ſome that had lain long upon the Sea Shore, and burnt them, I found the Lime-water they afforded mix with Soap as well as any other (*b*): But neither it, nor the Cockle-ſhell Lime-water, ſeem to have their Virtue ſenſibly increaſed by the Soap.

May

(*b*) I boiled ſome Oiſter-ſhells four or five Hours, changing the Water thrice in that Time, thinking that this might free them of their Salt, and render their Lime-water miſcible with Soap; but without any Effect. However, I ſhould adviſe the boiling and waſhing of theſe Shells before they are calcined; as it ſeems to free the Lime-water of ſomewhat of a fiſhy Taſte it otherwiſe has.

Are not the Particles of Shell-lime more subtile, saponaceous, and penetrating, than those of Stone-lime? Does not Shell Lime-water partly owe its greater dissolving Power to this? And, because if it is naturally saponaceous and penetrating, is not the Effect of Soap upon it, less remarkable than upon Stone Lime-water, which is more devoid of these Qualities?

[67.] Having poured a very weak Solution of Soap upon some calcined Oister-shells, I procured a Liquor tasting somewhat of Soap, and strongly of Lime; which, in thirty eight Hours warm Digestion, reduced a Piece of *E*, four Grains, to one and one-third Grains.

After this I dissolved three Drams of Soap in thirty five Ounces of boiling Water, and poured it on five Ounces of calcined Oister-shells. The *Lixivium* which they afforded, tasted strong of the Soap as well as Lime, and was pretty pungent and disagreeable. Being mixed with Urine, it produced the same Appearance as simple Lime-water (*i*); but raised a Smell something like that of burnt Horn. A Piece of *B*, three Grains and a half, being immersed in it, was, in twenty four Hours warm Digestion, reduced to one Grain.

The Strength of this *Lixivium* was probably owing to its abounding with the fiery Particles of the Quick-lime; which are more strongly attracted by the Solution of Soap,

(*i*) See No. 8. above.

(on account of the alcaline Salt in it), than by common Water.

68. A Solution of Soap in freſh Small-beer, had no Effect in diſſolving ſome Pieces of *A*, although allowed to lie eight Days in it, in a moderate Heat.

69. A Solution of Soap, made in one Part of *Scots Aquavitæ*, and two Parts of Water, has very little Virtue, though more than the preceeding.

Thus we ſee, that the diſſolving Power of Soap, as well as Lime-water (*k*) is deſtroyed by fermented Liquors, and greatly weakened by Spirits; and, conſequently, how proper it is for ſuch as uſe it, to abſtain from them.

70. I put a Piece of *B*, ſeven Grains, in a Solution of *Alicant* Soap; which, by being kept in a gentle Heat for four Days, loſt two Grains of its Weight.

71. At the ſame time I infuſed two Pieces of *B*, each weighing eight Grains; the one in two Ounces of the above Solution, with a Dram of white Sugar; and the other in two Ounces of the ſame, with a Dram of Honey: The *Calculus* in the Solution with Sugar, loſt about two Grains in four Days warm Digeſtion, while the other was ſcarcely diminiſhed in Weight above one Grain.

As in refining Sugar a good deal of Lime-water is employed, ſo it is probable, that ſome of the more active and ſubtile Parts of the Lime may adhere to it. And this may

(*k*) See No. 24. 25. 26. and 30. above.

may be the Reaſon why it deſtroys the Virtue of Lime-water leſs than almoſt any other Subſtance, and ſeems ſcarce to weaken the diſſolving Power of Soap at all.

From this Experiment it appears, how much the lithontriptick Virtue of Mrs. *Stephens*'s Medicines muſt be weakened, by her ordering the Decoction to be ſweetened, and the Pills to be made up with Honey; and that in place of it the *Syrupus de Saccharo* and Sugar may be ſubſtituted with conſiderable Advantage.

72. I infuſed a Fragment of *B*, five Grains and a half, in a Solution of *Alicant* Soap, made in a ſtrong Decoction of *Aſparagus*; which, after digeſting warm for five Days, had loſt near two Grains.

73. Moſt People have, doubtleſs, had Occaſion to obſerve, that while the internal Part of *Alicant* Soap is of a blue Colour marbled with white, its Surface, which is expoſed to the Air, is reddiſh, and ſometimes yellow or white. Now, as by the above Experiments we have found, that the lithontriptick Virtues of Soap and Lime-ter are in many Inſtances deſtroyed by the very ſame Things; and as Lime-water, by being expoſed to the Air, is ſoon rendered effete, I made the following Experiment, to ſee if that Part of the Soap, which has its Colour changed by the Air, poſſeſſes leſs Virtue than the reſt.

Having diſſolved ſome of the internal bluiſh Part of *Alicant* Soap in warm Water, I infuſed in it a Piece of *B*, ſix Grains;

which, in three Days warm Digeſtion, loſt near two Grains.

At the ſame time, I made a Solution of equal Strength, of the external Part of the ſame Soap, in warm Water, and immerſed in it a Fragment of *B*, ſix Grains: After digeſting fifty eight Hours warm, and fifteen cold, it had only loſt about three fourths of a Grain.

α From this Experiment it is plain, that ſuch as ſwallow Soap for the Stone or Gravel, ſhould carefully throw aſide that Part of it which has had its Colour changed by the Air; and as in very old Soap I have ſeen this about one third of an Inch thick, it is very probable, that two Ounces taken with this Caution will have as much Effect as two and a half, when good and bad are ſwallowed both together.

β Hence it alſo appears, how improper it is to make Soap into Pills, unleſs they are preſently to be uſed; and conſequently how much Mrs. *Stephens*'s Medicines muſt have ſuffered in this way. For, as the Air, in rendering the Soap effete, acts only upon its external Surface, the more the Surface is increaſed, the greater will the Quantity be that is deprived of its Virtue. Thus, ſuppoſe a cubical Piece of Soap of four Inches, made into twelve or fifteen hundred Pills, its Surface, which was before only ninety ſix, will now, perhaps, be above a thouſand ſquare Inches; and conſequently, in a given Time, the Pills muſt loſe ten times more of their Virtue, than ſuch a Piece

Piece of Soap, if allowed to remain whole. Soap ſeems alſo to be rendered a good deal the worſe when reduced to a Powder; whereby, not only its lithontriptick Power is weakened, by its Surface being thus increaſed, and expoſed to the Air, but the watery and oily Parts of the Soap being moſtly evaporated, leave the alcaline Salt very much exalted, and deprived in a great meaſure of that which was intended to correct it.

γ From this it ſtill further appears, that the diſſolving Virtue of Soap lies chiefly, if not wholly, in the Lime that is in it (*l*); and not at all in its alcaline Nature, which is not ſo ſoon nor ſo remarkably deſtroyed by being expoſed to the Air.

74. Potaſh, three Drams, Oil of Olives, five Drams, Stone Lime-water, four Ounces, being mixed, and boiled over the Fire to the Conſumption of one half, I put a Piece of *A* in it; but, after ſtanding in a gentle Heat ſeveral Days, found no Appearance of its being in a diſſolving State.

As in this Mixture the Oil was not ſufficiently united with the Potaſh and Lime-water, I imagine the Surface of the Stone being beſmeared by it, hindered theſe from having that Effect they otherwiſe would have had (*m*).

From the ſame Cauſe I fancy it was that Soap-leys and Oil did not diſſolve the *Cal-*

(*l*) See No. 60. and 66. above.
(*m*) See No. 62. above.

culus in one of Dr. *Hales*'s Experiments (*n*). He ſeems, indeed, to think, that, in order to the Soap-leys exerting their Virtue, the Oil muſt be ſeparated from them; which he reckons is done in the Courſe of the Circulation. But, with Submiſſion, I would think it only neceſſary that the Oil ſhould loſe its Nature, ſo far as to become miſcible with Water. Thus we find a Solution of Soap diſſolves the Stone, although the Oil be not ſeparated from the other Ingredients of the Soap.

75. Dr. *Hales* having been lately informed, that Oiſter-ſhell Lime-water, mixed with *Spir. Nitri dulcis*, in the Proportion of an *Engliſh* Pint of the former to half an Ounce of the latter, was a more powerful Solvent of the Stone out of the Body than the Lime-water alone; in order to know the Truth in this Matter, he added half an Ounce of dulcified Spirit of Nitre to a Pint of Oiſter-ſhell Lime-water, made by pouring a Gallon of Water on a Pound of calcined Shells, and having filled a Phial of two Ounces with this Mixture, he put into it a Piece of a large *Calculus* X, weighing twelve Grains. At the ſame time he put into a like Phial, filled with the Lime-water unmixed, another Piece of the ſame *Calculus* Z, weighing eleven Grains. Both theſe Phials were placed in a Heap of Dung, whoſe Warmth was ninety four

(*n*) Vid. Experiments on Mrs. *Stephens*'s Medicines, p. 35.

four Degrees, according to *Farenheit*'s Thermometer.

After forty three Hours, the Surfaces of both theſe Stones were covered with a white Mucilage, but there was much leſs of this on the *Calculus* X than on Z: the ſame Difference was obſerved after ſixty three Hours; but after this it became leſs ſenſible. In a few Days after the Phials were taken out of the Dung, the Lime-water unmixed loſt its diſſolving Power entirely; but that to which the dulcified Spirit of Nitre was added, continued, for two Months, to turn the Surface of its *Calculus* to a very thin Coat of white Mucilage.

From this Experiment which the Doctor was ſo good as to communicate to me, it appears, that dulcified Spirit of Nitre rather weakens than increaſes the diſſolving Power of Oiſter-ſhell Lime-water; but that this Lime-water mixed with it, retains a lithontriptick Virtue much longer than it would otherwiſe do. Whether this diſſolving Power, which continues ſo long, be owing to the Lime-water preſerved from becoming effete, by the *Spir. Nitr. dulc.*; or, whether it is not rather to be aſcribed wholly to this Spirit, which, when mixed with Common-water, diſſolves the *Stone* (*o*), I ſhall not preſume to determine; though the latter Opinion ſeems moſt probable.

However,

(*o*) *Rutty's* Exper. on Mrs. *Stephens's* Medicines, Sect. IV. cap. 35, and 36.

However, ſince dulcified Spirit of Nitre does not much abate the Virtue of Lime-water, and is itſelf poſſeſſed of a lithontriptick Power, it may be ſafely given to Patients who are under a Courſe of Lime-water for the *Stone*; and as it is a good Remedy for Wind in the Stomach and Guts, provokes Urine, allays Heat and Thirſt, prevents Putrefaction, and reſtores a depraved Appetite from corrupted Humours, many Caſes may occur, where it may be preſcribed, to great Advantage, along with the Lime-water.

We have obſerved above, (N° 10.) that Lime and its Water volatiliſe the Salts, and corrupt the Oils of the animal Humours; when therefore we meet with calculous Patients, whoſe Fluids have a more than ordinary Tendency to Putrefaction, it might be very proper to make them add a few Drops of dulcified Spirit of Nitre to every Draught of the Lime-water.

76. A Piece of *B*, twelve Grains, being infuſed in Spirit of Sea-ſalt for near ſeven Days, the greateſt Part of which it was kept in a moderate Heat, had only three Grains of its Subſtance diſſolved.

By comparing this Experiment with thoſe of N° 17. 18. 19. and [64], it appears, that both Soap-leys and Oiſter-ſhell Lime-water are ſtronger Diſſolvents of the *Calculus* than Spirit of Sea-ſalt.

If an Ounce of Spirit of Sea-ſalt be mixed with eight or ten Ounces (*p*) of Spring-water,

(*p*) According to the Strength of the Spirit.

water, or Lime-water, and poured upon calcined Oiſter-ſhells freſh from the Fire, a great Ebullition and Heat enſues. After this is over, and the Lime quite fallen to the Bottom, a clear Liquor remains above; which being filtered through a Piece of Flannel, is as pellucid, and void of Colour as Water. This Ley has no Smell; but a pretty ſtrong ſaline, and ſomewhat pungent Taſte, with a ſmall Degree of Aſtringency. If it retains any thing of the peculiar Smell or Taſte of the Spirit of Sea-ſalt, this ſhews that the Spirit has not been thoroughly ſaturated by the Lime. To prevent this, I found it of Uſe, to mix with the Spirit of Sea-ſalt and Water, before I poured them on the Lime, a ſmall Proportion of purified Potaſh, not with a View to ſaturate the Spirit, but a little to abate its Force, and ſtrong diſagreeable Scent.

This Ley of Sea-ſalt and Shell-lime has very little Virtue in diſſolving the *Calculus*. It is true, that after lying ſome time in it, in a moderate Heat, the Surface of the Stone becomes white, and throws off a few rotten Scales; but it is three or four times longer in diſſolving, than in Oiſter Lime-water. And I have obſerved, that when no Potaſh was added to the Spirit of Sea-ſalt, although the Ley were pretty free of the peculiar Taſte of the Spirit; yet it ſeemed to have no Power almoſt at all of diſſolving the Stone.

Hence we ſee, that, while in Soap-leys the diſſolving Power of Quick-lime is greatly heightened by the Addition of an alcaline

Salt,

Salt, which of itſelf has little or no lithontriptick Virtue; this ſame Quality of the Lime is greatly weakened, or entirely deſtroyed, by an acid Salt, which is naturally a Solvent of the *Calculus*.

The Quack Medicine ſold at *London*, under the Name of the *Liquid Shell*, ſaid to be calcined Shells, reduced to a liquid Form, and diſcovered by Baron *Schawenberg*, a *German* Nobleman, ſeems to be no other than ſuch a Ley of Spirit of Sea-ſalt, Potaſh, and Shell-lime, as we have juſt now deſcried; at leaſt, ſo far as I have been able to obſerve, they agree in every Quality (*q*). They have preciſely the ſame Colour and Taſte; mixed with Spirit of Vinegar or Spirit of Vitriol, neither of them effervesce: Hence they are not alcaline. With a Ley of Potaſh, they make no Ebullition, but are turned into a white *Coagulum*. Upon adding Oil of Vitriol to them, a violent Ebullition enſues, with a ſtrong Smell of Spirit of Sea-ſalt, and a white *Coagulum* falls to the Bottom. When mixed with a Solution of Mercury in *Aqua fortis*, they immediately precipitate the Mercury.

A Piece of *B*, four Grains, after twenty eight Hours warm, and as long cold Digeſtion,

(*q*) Dr. *Linden*, in an Appendix to his late Book on Mineral Waters, has given us ſeveral Proceſſes for making the liquid Shell; concerning the Virtues of which, he talks more in the Style of an Empirick, than of a rational Phyſician. His ſecond Method of making it, is by pouring a Pound and a half of Water on calcined Oiſter-ſhells and *Sal. Ammon. crud.* each a Pound.

geſtion, in a ſmall Phial full of the *Liquid Shell*, had only half a Grain of its Subſtance diſſolved.

Hence it appears, that this Medicine is neither acid nor alcaline, contains little of the Virtue of the calcined Shells, and has but a very inconſiderable Power of diſſolving the Stone. How juſtly then it is ſaid to diſſolve the *Calculus* out of the Body in a few Hours, in a moderate Heat, or has been extolled as a grand *Alcali*, and a powerful Solvent of the Stone in the Bladder, is left to every one to judge.

SECT. XI.

Of the particular Action of Lime-water, *in diſſolving the* Stone.

ALTHO' it is of much greater Importance to Mankind to know that a certain Remedy is able to cure this or the other Diſeaſe, than to be informed of the preciſe Manner in which it produces this Effect; yet to inveſtigate the Operation of Medicines in the Cure of Diſeaſes, is not only a Subject worthy of a Phyſician, and highly entertaining to a philoſophical Mind, but alſo of very conſiderable Uſe in Practice; for it is likely that a Medicine, whoſe real Nature and manner of acting upon the human Body are known, will be more judiciouſly and happily applied in the Cure of Diſeaſes, than one, whoſe unknown Nature and ſpecifick Operation,

tion, ſcarcely afford any Indication, in what particular Stages of a Diſeaſe, or Circumſtances of the Patient, it may be uſed with the greateſt Proſpect of Succeſs, and the ſmalleſt Chance of Miſchief; when it may be moſt proper to adminiſter it, and when to refrain from its Uſe. As therefore we have made it appear, that Lime-water not only diſſolves the *Calculus* out of the Body, but ſometimes even while in the Bladder; it will not, I hope, be looked upon as an uſeleſs Inquiry to endeavour to point out the particular Manner of its Operation.

The *Calculus* conſiſts of Water, Earth, Air, Salt and Oil. Whatever *Menſtruum* therefore, can ſeparate any one of theſe Principles from the reſt, will more or leſs diſſolve or break the Stone.

The Water which enters the Compoſition of the *Calculus*, is not to be extracted but by the Force of Fire in Caclination, and the Earth is the moſt fixed and immutable of all its Principles; the Action of Lime-water therefore in diſſolving the Stone, muſt be either upon its Air, Oil or Salt.

With reſpect to the firſt of theſe, as the *Calculus* when diſſolved in a cloſe Veſſel, by Lime-water, generates no Air, it manifeſtly follows, that it does not act by ſeparating this Element from the other conſtituent Parts of the Stone (*q*). But as Quick-lime readily unites

(*q*) Spirit of Nitre and *Aqua fortis*, indeed, generate a great deal of elaſtick Air, while they diſſolve the *Calculus*, and are probably the moſt powerful Solvents of this Concretion,

unites with Oil, (*Sect.* 1. N° 3. above) it is probable that its ſubtile and highly attenuated Particles, which are inviſibly ſuſpended in the WATER, may ſeize upon and unite with the oily Parts of the Stone, and ſo contribute to deſtroy its ſolid Form: And the perfectly white Powder to which the *Calculus* is reduced by Lime-water, ſhews that this *Menſtruum* acts, partly at leaſt by extracting its Oil.

However, of all the Principles of the Stone, its Salt is that upon which Lime ſeems to act moſt powerfully. Every one knows that Quick-lime volatiliſes crude *Sal Ammoniac.* and Lime-water produces the ſame Effect, though in a leſs remarkable Degree.

And, as the animal Salts of the Urine and *Calculus* greatly reſemble *Sal Ammoniac*, ſo we find that Lime acts upon them all in the ſame manner. Thus Urine mixed with Quick-lime, ſends forth a penetrating ſaline urinous Vapour, which is ſtronger or weaker as the Urine is ſtale or freſh, or as it is more or leſs impregnated with Salts. Lime-water has a ſimilar, but much weaker Effect. *Vid. Sect.* 1. N° 7. and *Sect.* 2. N° 10. above.

A Piece of a *Calculus* which had been in my Cuſtody ſeven or eight Years, being reduced to a Powder, and mixed with Quick-lime, upon adding warm Water, and ſtirring the Mixture, ſent forth a weak urinous Smell; but if this Stone had been recently extracted

tion, becauſe they act ſo remarkably upon its latent Air, which exceeds in Quantity all its other Principles taken together (*a*).

(*a*) *Hales*'s Staticks, Vol. 2.

from the Bladder, it would have probably afforded a ſtronger and more penetrating Vapour.

May 12. 1750. I put an Ounce of Gravel-ſtones with a Pound and a half of Oiſter-ſhell Lime-water, into a well-corked Bottle, and, having obſerved that the Stones ſeemed to diſſolve no more after the firſt eight or ten Days, (though kept in a Heat of about 100 Degrees of *Farenheit*'s Thermometer) on the 28th I poured off the Lime-water, and found about three Drams of the *Calculi* undiſſolved; the greateſt Part being mouldered down into a white Chalk-like Powder.

The Lime-water had a yellowiſh Colour, and a very particular kind of urinous, ſtinking, ſulphureous Smell, not eaſy to be deſcribed in Words. It had loſt all Taſte of the Lime, and, in place of it, had got a very diſagreeable one of the ſame Nature with its Smell. This putrid Water, after being expoſed to the Air three Days in an open Veſſel, loſt entirely its diſagreeable Taſte and Smell, but retained its yellowiſh Colour. Whence we are led to conclude, that as the Colour of this Water proceeded from the groſſer Oil of the *Calculus*, which is not volatile, ſo its Smell was owing partly to the more attenuated Oil, and chiefly to the Salt of the *Calculus* volatiliſed, and changed into a penetrating Vapour by the Action of the Lime-water.

It is obſervable, that as *Sal. Ammon.* mixed with Lime-water, hinders it from throwing up any Scum, ſo the Lime-water in this Experiment neither afforded an earthly Cruſt while kept

kept in the Bottle, nor afterwards when expoſed to the open Air.

Nor does Lime act thus in volatiliſing the Salts of the Urine and *Calculus* alone; for Blood freſh drawn from a Vein, being mixed with equal Parts of Lime-water, immediately acquires a kind of burnt urinous Smell.

From what has been hitherto offered, it may ſeem to follow, that Lime-water diſſolves the Stone, by volatiliſing its Salt, and uniting with its Oil: But then, as fixed alcaline Salts join with Oil, and volatiliſe *Sal Ammon.* and the Salt of Urine, as well as Quick-lime, it might be expected that a Solution of Potaſh, or Salt of Tartar in Water, ſhould alſo diſſolve the Stone; nay farther, as a ſtrong *Lixivium* of any of theſe Salts acts much more powerfully in volatiliſing ammoniacal Salts, and unites much more readily with Oils than Lime-water, it ought by the preceeding Experiments and Reaſoning, alſo to diſſolve the Stone more quickly than this *Water*, which however is by no means the Caſe; for altho' a Ley of Potaſh renders the Stone whiter, more friable and ſomewhat rotten, yet it does not diſſolve it (*r*).

Since therefore fixed alcaline Salts, which mix eaſily with Oils, and powerfully volatiliſe the ammoniacal Salt of the Urine, ſhew very little Power of diſſolving the *Calculus*, the principal and peculiar Action of Lime-water, whereby it ſo remarkably diſſolves this Concretion,

(*r*) Vid. *Hales*'s Exper. on Mrs. *Stephens*'s Medicines, and No. 62. below.

muſt conſiſt in its producing ſome Change upon the Principles of the Stone, different from what fixed alcaline Salts are obſerved to do. But the only thing in which the Action of Quick-lime, and of fixed alcaline Salts, upon *Sal Ammon.* and that of Urine, differs, is that while both ſeem equally to volatiliſe theſe Salts, the former alſo deſtroys their Power of effervеſcing with Acids, and ſo changes their Nature, as to render them incapable of being reduced to a ſolid Form. The Virtue of Lime therefore, in diſſolving the *Calculus*, ſeems chiefly to proceed from that Power which it poſſeſſes, not merely of rendering the Salts in this Concretion volatile, but of ſubtiliſing and dividing them in ſuch a Manner as thoroughly to deſtroy their Nature and Texture as ſolid Salts.

Soap-leys, or a *Lixivium* of Potaſh and Quick-lime is a much more powerful Solvent of the Stone, than either Lime-water or a Solution of Potaſh in Water, becauſe the alcaline Salt ſeems, by being joined with the Lime, to unite more readily with the Oil, and act more powerfully upon the Salt of the *Calculus*; at the ſame time, that the Lime may, from its Union with the alcaline Salt, acquire a greater Power of volatiliſing and deſtroying the Nature and Texture of the animal Salts: Further, Water impregnated with an alcaline Salt, attracts and retains the finer Parts of the Lime, in much greater Quantity than Water alone.

When a Fragment of a *Calculus* is immerſed in Soap-leys, there appear to iſſue from almoſt

moſt every Point of its Surface *Striæ*, or oily Streams, which run through the Ley exhibiting much the ſame Appearance that *Alcohol* does when mixed with Water. Theſe *Striæ* cannot be owing to elaſtick Air, emerging from the Surface of the Stone, ſince Soapleys, in diſſolving it generate no Air. Are they not more probably the oily, and perhaps ſaline, Parts of the *Calculus*, upon which this *Menſtruum* acts moſt powerfully?

It is obſervable that while Lime-water diſſolves the *Calculus*, it does not affect biliary Concretions, though much leſs firm and hard. The Reaſon of which is, that the former abound much more with Salt than the latter, and we have ſhewn above, that the lithontriptick Virtue of Lime-water is chiefly owing to its peculiar Action upon the Salts of the Stone. But a *Lixivium* of Salt of Tartar, although it has little Influence on the *Calculus*, diſſolves the biliary Concretions (*s*); becauſe the alcaline Salt unites readily with Oil, which is the Principle that abounds moſt in them.

Mr. *Morand* has remarked, that Mrs. *Stephens*'s Medicines are not ſo ſucceſsful in young as in old Patients (*t*); and I have obſerved the ſame Thing with regard to Lime-water and Soap. At firſt I was ready to aſcribe this to Children's not taking theſe Medicines regularly, and in the proper

(*s*) *Hales*'s Staticks, Vol. 2. pag. 192.

(*t*) Memoires de l' acad. des ſciences, 1740, Edit. 8vo. p. 256. 268. and 269.

Quantity; but, upon further Conſideration, I am inclined to think there is ſomething more in it, eſpecially ſince my good Friend and Collegue Dr. *Alſton*, who has of late been employed in making many curious Experiments on Lime and its Water, informed me, that he had obſerved *Calculi* extracted from Children to diſſolve more ſlowly in Lime-water, than thoſe which were taken from old People.

Children, on account of the weak State of their digeſtive Organs, and their Food being almoſt wholly of the aceſcent kind, are remarkably ſubject to Acidities in the *primæ viæ*. And if we may depend upon Mr. *Homberg*'s Experiments, the Blood of young Animals affords a greater Quantity of Acid than the Blood of old ones (*u*); nor can this Acid be wholly deduced from the Sea-ſalt in their Blood, ſince in older Animals the Humors abound at leaſt as much with this Salt, as in younger ones. It is not improbable, therefore, that in Children, the ammoniacal Salt of the *Calculus*, may contain a greater Proportion of Acid, than in old People. And as Clays, or argillaceous Earths, are ſaid to be of no Uſe in Pottery, when deprived of their Acid, becauſe they do not acquire a proper Firmneſs and Coheſion when burnt; ſo, perhaps, the Stone in old People may be of a leſs firm Coheſion, becauſe their Fluids are more deſtitute of an Acid, than thoſe of Children.

The

(*u*) Memoires de l' acad. des ſciences, 1712.

The Medicines, therefore, againſt the Stone, are probably leſs ſucceſsful in young than in old Patients; not only becauſe their Efficacy muſt be more weakened by the greater Proportion of acid in the *primæ viæ*, Blood and other Humors of the former, but alſo on account of the greater Firmneſs and Coheſion of the Principles of the Stone.

SECT. XII.

Of the Cure of the Stone.

HAVING given an Inſtance of the Succeſs of Lime-water in diſſolving the Stone, and illuſtrated its Virtue this Way by a Variety of Experiments; in the Courſe of which we have been ſo lucky as to diſcover the remarkable Virtue of Oiſter ard Cockle Shell Lime above Stone-lime; it remains that a Method of Cure be laid down, founded upon the above Hiſtory and Experiments.

I. Firſt, then, I would adviſe the Patient to ſwallow every Day, in any Form that is leaſt diſagreeable, an Ounce of the internal Part of *Alicant* Soap (*x*) and, drink three *Engliſh* Pints or more of Oiſter or Cockle Shell Lime-water. If he takes the Soap in Pills, or ſhaved down as Mr. *Millar* did, he may divide it into three Doſes; the largeſt to

(*x*) The external Part, which is diſcoloured by the Air, is deprived in a good Meaſure of its Virtue, See No. 73. above.

to be taken faſting in the Morning early; the ſecond, at Eleven before Noon; and the third, at Five after Noon; drinking above each Doſe a large Draught of the Lime-water; the Remainder of which he may take after Dinner or Supper, inſtead of other Liquor. The diſagreeable Taſte of the Lime-water may be blunted, by adding a very little ſweet Milk to it; and is quite deſtroyed, by waſhing one's Mouth immediately after drinking it with a little Vinegar and Water; which, however, muſt be carefully ſpit out again (*y*). But, if the Patient finds Difficulty in taking the Soap in this Form, or if it does not ſit eaſy on his Stomach, let him diſſolve (*z*) an Ounce of it in an *Engliſh* Pint and a half of warm Lime-water, made with Shells that have been long expoſed to the Weather, and take this at three different Times, drinking the reſt of the Lime-water by itſelf. If it ſhould happen, that Shell Lime-water cannot be had, then let him take the ſame Quantity of Stone Lime-water, with at leaſt an Ounce and a half of Soap; ſince its diſſolving Power is ſo much increaſed by it (*a*).

It is obſervable, that a Solution of Soap in Lime-water has not ſo diſagreeable a Taſte, as a Solution or Decoction of it in common Water.

The

(*y*) One Dram and a half, or two Drams, of Juniper-berries, infuſed in every Chopin Bottle of it, will mend its Taſte much.

(*z*) A Solution is preferable to a Decoction. See No. 56. above.

(*a*) See No. 66. above.

The Soap is not only proper to be taken along with the Shell Lime-water, as it is endued with a conſiderable Power of diſſolving the Stone, but likewiſe as it will deſtroy all acid Humors in the Stomach and Guts, contribute greatly to keep the Belly eaſy, and prevent any Coſtiveneſs that might otherwiſe be occaſioned by the Lime-water.

At firſt the Patient ſhould begin with a ſmaller Quantity of the Lime-water and Soap than what is mentioned above; perhaps an *Engliſh* Pint of the former and three Drams of the latter, taken daily, may be enough. This Quantity, however, he may increaſe by degrees; and ought to perſevere in the Uſe of theſe Medicines, (eſpecially if he finds any Abatement of his Complaints, or Symptoms of the Stone diſſolving) for ſeveral Months, nay, if the Stone be very large, Years.

Further, it may be proper for the Patient (if he is ſeverely pained) not only to begin with the Soap and Lime-water in ſmall Quantities, but alſo to uſe the ſecond or third Lime-water, inſtead of the firſt. However, after he has been for ſome time accuſtomed to theſe Medicines, he may not only take the firſt Water, but, if he finds he can eaſily bear it, heighten its diſſolving Power ſtill more, by pouring it a ſecond time on freſh calcined Shells (*b*). An *Engliſh* Quart of this ſtrong Lime-water, with an Ounce, or an Ounce and a half of Soap diſſolved in it, and taken daily, would, I dare ſay, anſwer as well in calculous

(*b*) Vid. Sect. iii. No. 21. above.

calculous Caſes, and be as little diſagreeable, as any Method yet propoſed.

During a Courſe of Lime-water and Soap for the Stone, the Patient ſhould abſtain from all acid and fermented Liquors, as Vinegar, Wine, Ale, Beer, Cyder, *&c.* For his Drink he may have Water and Milk, or a Ptiſan made with Roots of Althea, Parſley, and Liquorice: But, if he has been accuſtomed to more generous Liquors, and cannot confine himſelf thus far, he may be allowed a little Mountain Malaga, or ſome weak Punch, made without any Acid; but, as the Virtue of Soap is much weakened when diſſolved in Punch (*c*) and entirely deſtroyed by Spirits (*d*); and as Quick-lime has its Nature conſiderably changed by them (*e*), they ought not to be drunk by themſelves, nor even in Punch to any great Quantity. It will alſo be proper to be ſparing in the Uſe of ſalt Meats (*f*), and Honey (*g*), and to refrain from all Fruits that have any Acidity or Sharpneſs (*h*); while, on the other hand, Milk and Sugar (*i*) and animal Food, with the Vegetables mentioned N° 39.—45. may be ſafely uſed.

As the Cure depends upon the Urine being ſtrongly impregnated with the Virtues of the Lime-water, the Patient ought to drink no

(*c*) See No. 69. above
(*d*) *Hales*'s Experiments, p. 2.
(*e*) See No. 1. and 2. above.
(*f*) No. 50.
(*g*) No. 34. and 71.
(*h*) No. 36. and 38.
(*i*) No 33. and 35.

no more of any other Liquors than is neceſſary to quench his Thirſt, and ſhould retain his Urine as long as he can without Uneaſineſs, that it may have the greater Time to act upon the Surface of the Stone.

If, from catching cold, or too violent Motion or Exerciſe, the Patient's Pains ſhall happen to be greatly increaſed, it may be proper to leſſen, or even to abſtain for a few Days from his Medicines, and to have recourſe to Opiates, emollient Clyſters, Fomentations and warm Baths. If the Soap and Lime-water ſhall occaſion a greater Heat and Thirſt than uſual, thirty or forty Drops of dulcified Spir. of Nitre may be taken in a Draught of Lime-water twice or thrice a Day (*k*).

If the Lime-water ſhould chance to occaſion Coſtiveneſs, it will be proper now and then to take a Pill, of equal Parts of Aloes and Soap, or any other of the Purgatives mentioned No. 51.—55.

If, inſtead of the Soap, a Quarter of an Ounce of a Ley made with purified Potaſh and calcined Oiſter-ſhells, diluted with five Ounces of Lime-water, an Ounce of ſweet Milk, and half an Ounce of Syrup of Sugar, were ſwallowed twice or thrice a Day; it would, probably, be leſs burdenſome to the Stomach, and certainly would contribute more to the ſpeedy Diſſolution of th e Stone as it is poſſeſſed of a much ſtronger lithontriptick Virtue than the Soap. And this Ley is preferable to common Soap-leys, as we have already

(*k*) Vid, Sect. x. No. 75. aoqre,

already obſerved; not only upon account of its being leſs nauſeous, but alſo as it is a more powerful Solvent of the *Calculus* (*l*).

But if we ſhould meet with any Patients who have an invincible Averſion to Soap in any Shape, or to whom, upon account of Ulcerations in the urinary Paſſages, it would be improper either to preſcribe Soap or this alcaline Ley; in ſuch Caſes the above Experiments give us Reaſon to think, that Oiſter or Cockle Shell Lime-water alone drunk in large Quantities, will have fully greater Effect in diſſolving the *Calculus*, than Stone Lime-water, even when aſſiſted by Soap (*m*): So that, in place of all Mrs. *Stephens*'s Medicines, which to many delicate People can be of little Uſe, we may ſubſtitute this Lime-water with equal, nay probably greater Succeſs.

To put this beyond any reaſonable Doubt, I need only relate the following Experiment.

Dr. *Hartley*'s Maſs of Soap, Lime, and Salt of Tartar (*n*), which contains every thing valuable in Mrs. *Stephens*'s Medicines, is by him ordered to be taken from three to four Ounces a Day; and I have often preſcribed Lime-water from three to four *Engliſh* Pints daily: To know, therefore, from which of the two Medicines the greateſt Benefit is to be expected

(*l*) See above, No [64.]

(*m*) Compare the Experiments of the diſſolving Power of Oiſter and Cockle Shell Lime-water, No. 14.—20. with Experiments of the Effects of a Solution of Soap in Stone Lime-water, No. 66. See alſo the Table at the End of his Eſſay.

(*n*) See Page 157. above.

expected in the Cure of the Stone, I diſſolved that Gentleman's Maſs in ſixteen times its Weight of boiling Water, and immerſed in it a Piece of *B*, of thirteen Grains; and at the ſame time infuſed another Fragment of *B*, of the ſame Weight, in Oiſter Lime-water, made with ſix Pounds of Water, to one Pound of freſh calcined Shells. After thirty five Hours warm and twenty three cold Digeſtion, the Fragment in the Lime-water had ſix Grains and a half of its Subſtance rotten and diſſolved, while that in the Solution of Dr. *Hartley*'s Maſs had only loſt three Grains.

Dr. *Hartley* in his *Latin* Epiſtle to Dr. *Mead*, publiſhed laſt Summer, has propoſed a Variety of Methods, in which Powder of Lime, Soap, Soap-leys, or fixed alcaline Salt may be taken for the Cure of the Stone: But as the following Compoſition, which was communicated to me, at his Deſire, by Dr. *Hales*, differs in ſome Things from any of the *Formula's* in his Epiſtle, I ſhall, here, give it to the Publick.

" Take *Alicant* Soap ſhaved, eight Parts, " Oiſter-ſhell Lime one Part, pour upon " them a little Water, and beat them into " a ſoft uniform Maſs: Then diſſolve this " Maſs into an Emulſion, by adding more " Water, ſo as to make ſix Quarts of Emul- " ſion from every Pound Avoirdupois of " Soap. Let this Emulſion ſtand expoſed " to the Air for a Month in a wide-mouth- " ed Veſſel, being ſtirred frequently and laved " in and out of the Veſſels, as in cooling " Liquors. By this means it will become

" mild to the Taſte, Stomach, and urinary " Paſſages. The Doſe is half a Pint three " times a Day. It may be called the al- " caline Emulſion for the Cure of the " Stone."

Altho' it is probable that this Emulſion, like the Solution of Dr. *Hartley*'s Maſs above mentioned, would diſſolve the *Calculus* out of the Body, more ſlowly than ſtrong Oiſter-ſhell Lime-water, yet it may perhaps produce greater Effects in the Body, becauſe it contains a certain Quantity of Lime not fully ſlaked, which muſt therefore communicate its Virtues to all the Humours it meets with in its Paſſage through the Stomach and Guts. However, as the ſafeſt, and leaſt offenſive, Way of conveying the Virtues of Lime-water into the Blood, is by drinking its Water; and as this Water, by being poured a ſecond or third time upon freſh calcined Shells, can have its Strength and diſſolving Power greatly increaſed (*o*), I would ſtill prefer it to Powder of Lime, in whatever Form. But, in Caſes where the Lime-water and Soap fail in giving the Patient Relief, the above Emulſion may be ſafely tried.

Such as have no Stone in the Bladder, but are ſubject to frequent Fits of Gravel in the Kidneys, might very probably prevent theſe, by drinking every Morning, two or three Hours before Breakfaſt, an *Engliſh* Pint of Oiſter or Cockle Shell Lime-water; which though it might be too ſmall a Quantity to have

(*o*) Vid. Sect iii. No. 21. above.

have a ſenſible Effect in diſſolving the Stone, yet would probably prevent any new Concretions.

Patients who have ſmall Stones in their Kidneys, often paſs (eſpecially before a nephritick Paroxyſm) dark-coloured Urine, very much reſembling Moſs-water or Coffee, and frequently feel ſome kind of dull Pain or Uneaſineſs in that Part of their Back where the Kidneys lie. I have known ſome Patients who, after diſcharging this kind of Urine for ſeveral Weeks, have in two or three Days voided 70 or 80 ſmall Stones, like Pin-heads; after which they continued for a conſiderable Time free of all graveliſh Complaints.

The dark Colour of the Urine in theſe Caſes is owing to Blood mixed with it, which ouzes ſlowly, and in ſmall Quantity, from the Veſſels of the Kidneys eroded by the rough Surfaces of the Stones lodged in them. This Blood does not run into Clots, becauſe it is mixed with the Urine very gradually, and only in a ſmall Proportion; and it loſes its red Colour, by being retained a conſiderable Time in the Body, before it is evacuated. In like manner, Blood ouzing ſlowly from the ſmall Veſſels of the Stomach, and lying there for ſome time, is vomited up of a dark Coffee Colour, and often miſtaken for black Bile; whereas, when it flows in a greater Stream, and from larger Veſſels, it is thrown up with its natural Colour, either in Clots, or in a fluid Form. The beſt Remedies for this dark coloured Urine are mucilaginous Drinks, ſuch as *Arabic* Emulſion, a Decocti-

on of *Althea* Root, or an Infuſion of Lint-ſeed, which defend, in ſome degree, the Veſſels of the Kidneys againſt the Roughneſs of the ſmall Stones lodged in them; and Lime-water, which, while it ſoftens and renders ſmooth the Surfaces of theſe Stones, has, at the ſame time, a Tendency to heal the eroded Parts. Proper Doſes of *Opium* are alſo uſeful, as they not only facilitate the Expulſion of the ſmall Stones lodged in the Kidneys, but leſſen their Power of doing Miſchief while they remain there.

II. In order to render the Cure of the Stone in the Bladder ſtill more ſpeedy, I ſhall offer a Propoſal which, how far it may ſucceed, is left to the Judgment and Experience of others.

It is this, that ſuch Perſons as have a Stone in the Bladder, ſhould, at the ſame time they are taking the Medicines above directed, have four or five, or more Ounces of tepid Shell Lime-water injected into their Bladder every Day, to be retained as long as they can without Pain; for which Purpoſe they ſhould evacuate their Urine immediately before the Injection. Were it not for the Trouble of introducing the *Catheter*, ſuch Injection might be made twice or thrice a Day; and if a flexible *Catheter* were always kept in the Bladder *(p)*, it might be done as often as one pleaſed, and ſo the Diſſolution of the largeſt Stones might be quickly procured. It will be proper to let the Patient drink Lime-water ſome Weeks before he uſes it by way of Injection,

(p) Heiſt. chirug. p. 883. and 938.

jection, in order to mitigate his Pains, and take off that Tenderneſs of the internal Coat of the Bladder, which generally attends this Diſeaſe; after which he will, with leſs Difficulty, be able to retain it when injected, ſo as it may have Time to act on the Surface of the Stone.

The Injection of warm Water into the Bladder has often been practiſed in order to the high Operation for the Stone; and if then it was ſometimes attended with bad Conſequence, this ſeems to have been owing to the great Quantity injected, whereby the muſcular Fibres of the Bladder, which reſiſt ſuch Diſtenſion, were too much and too ſuddenly ſtretched: But in the preſent Caſe (unleſs the Stone be very large) ſo ſmall a Quantity will be ſufficient, that if it be cautiouſly gone about, I do not ſee any Hurt it can do. And as from the Quantity to be injected, no bad Conſequences are to be feared (*q*), ſo neither is it probable, that from the Quality of the Liquor any would ariſe: For

(*q*) In *Le Dran*'s *Obſervat.* 80. we find a Decoction of Marſhmallows was injected into the Bladder, Morning and Evening, for a conſiderable Time, without the ſmalleſt Inconveniency, and with remarkable good Succeſs in that particular Caſe; which was, as he calls it, a *Veſſie racornie*: To ſave the Trouble of introducing the *Catheter* twice, he let it remain in the Bladder from the Morning till after the Evening Injection was over. And in Dr. *Hales*'s *Staticks*, Vol. 2. p. 212, we are told, that in four Hours Time he cauſed, by means of a double *Catheter* there deſcribed, 900 cubick Inches, or three *Engliſh* Gallons of warm Water, to flow in and out of a Bitch's Bladder in a continual Stream, without the leaſt Harm or Inconveniency to the Animal that he could perceive.

Lime-water, we ſee, may be taken into the Stomach in great Quantities without any Harm, and when applied to the Eye, one of the tendereſt Parts of the human Body, it occaſions no conſiderable Uneaſineſs: It is made uſe of to waſh Sores with very good Succeſs. And, as ſometimes along with the Stone there are ſmall Ulcers or Excoriations in the Bladder, the Lime-water, either injected or taken by the Mouth, will diſpoſe them to heal up, inſtead of having any of the bad Effects which are to be feared from Mrs. *Stephens*'s Medicines, which render the Urine highly alcaline; and of which I had lately occaſion to ſee an Inſtance in a Patient, who, having ſeveral Symptoms of a Stone in the Bladder, had frequently taken a good deal of Soap, by which his Pains, eſpecially in making Urine, were always ſo greatly increaſed, that he was obliged to lay aſide the Uſe of it: But, upon inquiring more narrowly into his Caſe, I found he had, along with the Stone, an Ulcer in his Bladder, and paſſed conſiderable Quantities of purulent Matter. Agreeably to this Mr. *Morand* has obſerved, that in ſuch Caſes where, along with the Stone, there were any Ulcerations in the Bladder, Mrs. *Stephens*'s Medicines always occaſioned great Pain and Uneaſineſs (*r*); while, on the other hand, Dr. *Langriſh* found, that, when, by injecting too great a Quantity of Soap-leys, he had made Dogs void Blood with their Urine, Lime-water would immediately be retained

(*r*) Memoires de l'acad: des ſciences, an. 1740.

tained in the Bladder without any Uneasiness, and quickly heal up the small Vessels, which the Acrimony of the Soap-leys had eroded (*s*).

That the Injection of Lime-water into the Bladder may be rendered more safe, and attended with less Uneasiness, two Scruples or a Dram of *Starch* may be dissolved in six or eight Ounces of Oister Lime-water, and just brought to boil over the Fire, stirring it all the while: For having put a Piece of *B*, seven Grains, in such a Mixture as this, in three Hours Time there was a white rotten Crust formed all round it, which fell off upon shaking the Glass, and, in twenty four Hours time, above a Grain of it was dissolved. The Heat used in this Experiment did not exceed 100 Degrees in *Farenheit*'s Thermometer.

The fourth Part of the Yolk of an Egg being mixed with six Ounces of Lime-water, does not weaken its Virtues any more than the Starch, and may occasionally be used in place of it.

I tried also *Gum. Arab.* and *Sem. Lini*; but they both destroy the Virtue of Lime-water, more than the Starch or Egg.

I was very much pleased to find, that the Proposal I had made in the first Edition of this *Essay*, of injecting Lime-water, into the Bladder, with a View to the Dissolution of the Stone, had engaged the ingenious Dr. *Langrish* to pursue this Matter a good deal further. This Gentleman, in his *Physical Experiments upon*

(*s*) Physical Experiments, p. 19.

upon Brutes, published 1746, has shewn, that the Bladders of Dogs can not only bear Stone and Oister Shell Lime-water injected twice a Day for a Month, without any Pain or ill Effect following, but Lime-water mixed with Soap-leys, in the Proportion of fifteen, twenty, or twenty five Drops of the latter, to each Ounce of the former, provided a little Starch be added to blunt the Acrimony of the Soap-leys.

In the Year 1745, Mr. *John Campbell*, late Surgeon in this Place, at my Desire, injected near two Ounces of Oister-shell Lime-water, in which a little Starch was dissolved, into the Bladder of a Boy about ten Years of Age, who had been taken into the *Royal Infirmary* to be cut for the Stone. We directed him to empty his Bladder before the Injection was made, and he retained it without any Pain or Uneasiness for near three Hours.

Mr. *Campbell* after this injected, into the Bladder of a Man, Lime-water unmixed with any thing to soften it; which, however, gave no Pain nor Uneasiness, although retained a considerable Time. So that from these Trials upon the human Body, and Dr. *Langrish*'s Experiments upon Dogs, it appears, that the only thing wanting in order to the Dissolution of the Stone by Injections, is an easy Way of conveying these into the Bladder; for the introducing a common *Catheter* twice or thrice a Day, would necessarily give a good deal of Uneasiness, and soon fret the Parts; and it is not easy to contrive a flexible *Catheter* that could be always retained in the Bladder, without

out conſiderable Inconveniency. I have for ſome time entertained an Opinion, that, if a Syringe was made with a ſmall Pipe joined to it, which might be introduced three or four Inches into the *Urethra*, and the *Penis* graſped pretty firmly, ſo as that it ſhould cloſely embrace the Pipe of the Syringe, a Liquor might be puſhed with ſuch Force into the *Urethra*, as to overcome the Reſiſtance of the *Sphincter Veſicæ*, and make its Way into the Bladder, without doing any Harm, or giving much Pain *(t)*. And in this Sentiment I have been confirmed by a Gentleman, ſome Years ſince my Patient, who informed me, that he had frequently, without any *Catheter*, forced the *Sphincter*, and thus injected Lime-water into his Bladder, for the Cure of an Ulcer there. Nor do I apprehend, that an Injection forced into the Bladder in this Way, would be in any Danger of penetrating into the excretory Ducts of the *Proſtatæ*, or *Veſiculæ ſeminales*, before it overcame the natural Contraction of the *Sphincter*.

In order, however, to be fully ſatisfied as to this Matter, I recommended to Mr. WILLIAM BUTTER, Student of Phyſick, to try if he could not inject a Liquor, in the

(t) Or perhaps it might do better if there was an Ivory Pipe made, five or ſix Inches long, and of the Size of a common *Catheter*, with a Sheeps-bladder tied upon its great End, as is uſually done in Clyſter-pipes: For if the Injection was put into this Bag, and the Pipe introduced into the *Urethra*, it could be much more equably forced into the Bladder, than by a Syringe, which is apt to jerk, and is far from being ſo much at one's Command. *See* Langriſh's *Experiments*, p. 51.

the way juſt now propoſed, into the Bladders of ſome of the Patients in the *Royal Infirmary*. He got an Ivory Pipe made of about $4\frac{1}{2}$ Inches in length, whoſe Diameter was $\frac{1}{6}$, and its Bore $\frac{1}{10}$ of an Inch: Upon the great End of this Pipe, which was formed like a common Clyſter Pipe, he tied an Ox's Bladder; and, having put four or five Ounces of warm Milk and Water into it, introduced the Pipe near four Inches into the *Urethra* of *Thomas M'Curſy* aged nineteen; then directing him to graſp his *Penis* ſtrongly with his Hand, he puſhed forward the Injection with a good deal of Force; but, thro' a Neglect of ſome of the Directions to be mentioned below, little or none of the Liquor penetrated into the Bladder. However, after a few unſucceſsful Trials, he puſhed firſt four Ounces of Milk and Water, and afterwards four Ounces of Milk, into the Bladder of this Patient, without giving him any Pain or Uneaſineſs.

But as this Experiment did not ſucceed quite ſo well when I was preſent, I ordered a Pipe to be made of the ſame Diameter with the one above mentioned, but of 7 Inches in Length, thinking that, by this means, the injected Liquor might be made to act with more Force upon the *Sphincter* of the Bladder. As a Piece of Ivory could not be procured 7 Inches long, the Pipe was made of Tin. Upon the great End of it a Bladder was faſtened, into which having put four Ounces of Stone Lime-water, with a little Milk, and firmly tied the Bag, Mr. *Butter* introduced the Pipe into the *Urethra* of the before mentioned Patient, ('till, with

with my Finger, I felt the Point of it within leſs than an Inch and a half of the *Anus)* and endeavoured to puſh forward the Injection by ſtrongly preſſing the Bag, which, being too weak, burſt before almoſt any thing had got into the Bladder. But, having afterward procured a ſtronger Bag, he injected, between the Hours of Two and Eight in the Afternoon of this Day, four different times, into the Bladder of *Thomas M'Curſy*, five Ounces of tepid Oiſter-ſhell Lime-water, unmixed with any thing. The Injection was generally performed in a Minute, ſometimes a good deal ſooner. The ſame Afternoon (viz. *June* 30. 1752) he injected five Ounces of Lime-water into the Bladder of *Thomas Saunderſon*, another Patient in the *Infirmary*, aged 30, in the Space of forty Seconds. Theſe Patients neither complained of Pain when the Pipe was introduced, the Injection puſhed, nor when they voided the Lime-water, only *M'Curſy* ſaid, he perceived a little more *Stimulus* than when he uſed to make Urine, but not ſo much as to give him any Uneaſineſs worth mentioning. They had no Inclination to empty their Bladder immediately after receiving the Injection, and were able to retain it without any Difficulty. Altho' the Lime-water was perfectly limpid, yet when they voided it, after having been retained ſome Time in the Bladder, it had a turbid Appearance, and looked as if a few Drops of Milk had been added to it. That this Change of Colour in the Lime-water was owing to the Urine mixed with it, during

during its Stay in the Bladder, is evident from Sect. II. N° 11. where it is ſhewn, that Lime-water, when mixed with Urine, becomes whitiſh and turbid.

July 6. Mr. *Butter*, when I was preſent, injected with the ſhort Pipe, near five Ounces of Milk and Water, in little more than half a Minute, into the Bladders of the ſame two Patients, notwithſtanding one of them had, at the Time the Injection was made, a little of a Strangury from a Bliſter on his Head. Whence it appears, that the Length of the Pipe is not a Circumſtance ſo material as, at firſt, I was apt to imagine.

In order to make the Injection of Lime-water into the Bladder ſucceed better, it may be of Uſe to attend to the following Directions, which were obſerved by Mr. *Butter* in moſt of the above Experiments.

1. The Patient ought to empty his Bladder immediately before the Operation.

2. He ſhould lie in Bed upon his Back, with his Legs drawn up to his Body, and his Thighs aſunder.

3. He ſhould be forbid to reſtrain Reſpiration, but deſired to breathe in his uſual Way. He muſt likewiſe be put on his Guard, to give no Reſiſtance to the Injection, when he feels it entering into his Bladder, and to reſtrain any Attempt to make Urine, altho' he ſhould, at that Time, have a ſmall Inclination to it.

4. The Liquor to be injected ſhould be blood-warm, or nearly ſo.

5. The

5. The Bladder fixed to the Pipe muſt be ſtrong, and very firmly tied, otherwiſe it will be apt to burſt, or to allow the Injection to eſcape by the Ligature.

6. The Pipe ſhould be dipt in Oil before it is introduced into the *Urethra*.

7. After the Pipe is introduced, the Patient muſt compreſs his *Penis* very firmly with his Hand, elſe the Liquor, inſtead of making its Way into the Bladder, will return by the *Urethra* towards the Point of the Yard.

8. The Bag containing the Liquor to be injected muſt be preſſed by one or both Hands of the Operator, with a very conſiderable Force, in order to dilate the *Sphincter* or Neck of the Bladder.

9. At firſt the Lime-water may be ſoftened, by mixing it with a little Milk or Starch, and only four or five Ounces of it injected; but afterwards the Quantity may be increaſed to ſix Ounces, and double Lime-water may be uſed (*u*).

10. As, from the Principles of Hydroſtaticks, it is evident, that the Force required to dilate the *Sphincter* of the Bladder muſt be, *cæteris paribus*, proportional to the Surface of the Liquor contained in the Bag, no more ſhould be put into it, than is intended to be thrown into the Bladder. The not attending to this Circumſtance, was not only one Reaſon of the Bag's burſting, but alſo of the Injection's not paſſing ſo eaſily into the Bladder, in ſome of

(*u*) Vid. Sect. 3. No. 21. above.

the firſt Experiments, which were made with the Pipe of $4\frac{1}{2}$ Inches in Length.

It may be worth while to obſerve, that, as one can, at pleaſure, ſome how relax, in a ſmall Degree at leaſt, the *Sphincter Veſicæ*, a Patient would probably, after a few Trials, learn to puſh the Liquor preciſely at the Time of the Relaxation, whence he would make the Injection with more Succeſs upon himſelf, than the ableſt Surgeon could do upon another. But as more Force may be ſometimes required than he can apply with one Hand, Mr. *Butter* is of opinion, that, if the Liquor to be injected were put into a Pair of ſmall Bellows contrived for the Purpoſe, and the Pipe ſcrewed to their Noſe, the Patient could with little or no Difficulty bring the Sides of theſe Bellows together, ſo as to puſh the Fluid contained in them into the Bladder with great Force.

In the other Sex, whoſe *Urethra* is ſtreight and much ſhorter than in Men, the Pipe above deſcribed may be introduced into the Bladder itſelf without giving any Pain, and ſo the Injection be puſhed into it with the greateſt Eaſe.

If five Ounces of Oiſter-ſhell Lime-water were thus injected into the Bladder of either Sex, at ſeven or eight in the Morning, at Noon, and at Six in the Evening, and retained two or three Hours each time, there can be no doubt but that the Stone muſt as certainly be diſſolved in this way, as if it were immerſed in a Phial full of Lime-water, though indeed not ſo ſoon. And in Women, who may be eaſily taught to make the Injection themſelves,

ſelves, the Stone muſt, in time, be ſo certainly diſſolved, that, for the future, it will only be neceſſary for them to have recourſe to the Operation of Lithotomy in very rare Caſes, where the Stone is of ſuch Hardneſs, as to reſiſt the Force of the Oiſter-ſhell Lime-water.

Further, as the ſevere ſtimulating Pains, which generally accompany the Stone in the Bladder, are not ſo much owing to its Bulk, as to the Roughneſs of its Surface, the Oiſter-ſhell Lime-water injected, in the Manner above deſcribed, twice or thrice a Day, would not fail, in a very ſhort time, to give certain Relief from theſe Pains, by diſſolving the ſharp Points of the Stone, and converting its Surface into a ſoft chalky Subſtance.

However, it is to be obſerved, that while Lime-water is thus injected into the Bladder with a View to the Diſſolution of the Stone, it ought alſo to be drunk to the Quantity of an *Engliſh* Quart at leaſt, and an Ounce of *Alicant* Soap taken along with it every Day. As this will not only deſtroy that Quality in the Urine, whereby it generates and increaſes the Stone; but will communicate ſome degree of a diſſolving Power to it, and conſequently hinder it from weakening the Force of the Lime-water injected into the Bladder, ſo much as it would otherwiſe do.

SECT. XIII.

Comparative Value of the ſeveral Medicines.

THAT the Method of Cure juſt now propoſed may appear with greater Advantage, I ſhall ſtate in few Words the comparative Value of the ſeveral Medicines that are thought to bid faireſt for diſſolving the Stone. Of theſe only Lime-water and Soap can be ſafely taken into the human Body. Spirit of *Nitre*, Spirit of Sea-ſalt, Soap-leys, or the fiery *Lixivium* of No. 64. and Quick-lime, being all deadly Poiſons, are only capable of being uſed when diluted in a large Quantity of ſome watery Vehicle. And even then they do not promiſe ſo much as Lime-water: For as the Virtue of Spirit of *Nitre* ſeems to conſiſt in its extraordinary corroſive Acidity, which muſt be deſtroyed before it gets into the Blood, and ſtill more ſo before it arrives at the Bladder, I think nothing can reaſonably be expected from it, or any Medicines of this kind. In anſwer to this, it has been alledged, that although vegetable Acids are entirely changed by the digeſtive Powers of the human Body; yet this is not the Caſe with reſpect to mineral Acids: To which purpoſe the learned *Boerhaave* is quoted; where, in his Chymiſtry, he obſerves, that ſuch Acids as are fit to diſſolve Gold, Silver, &c. are generally too ſtrong for the concoctive Powers of Animals, and

hence

hence become Poiſons. But this Authority is as ſtrong as any thing can be againſt thoſe who uſe it: For, if the mineral Acids above mentioned are entirely changed by the Powers of the human Body, it is confeſſed they can have no Effect in diſſolving the Stone; and, if they are not deſtroyed, they become Poiſons, and conſequently cannot ſafely be exhibited with a View to the Diſſolution of the *Calculus*.

Spirit of Sea-ſalt is liable to the ſame Objections as Spirit of *Nitre*; at the ſame time that it is not near ſo powerful a Solvent of the Stone (*x*).

With regard to Soap-leys, or the fiery *Lixivium* of N° 64. it may be obſerved, that as they owe a great deal of their deſtructive Quality to an Ingredient that has ſcarce any Effect in diſſolving the Stone (*y*), they do not ſeem ſo well calculated for this End as Lime-water; which, at the ſame time that it is ſtrongly ſaturated with that Principle to which the Soap-leys owe their Virtue, is free of the alcaline Salt, which renders them in a great meaſure ſo noxious. But to ſet the Virtue which theſe two Medicines have of diſſolving the Stone ſtill in a clearer Light, it may not be improper to compare the Effects which Soap-leys had on Dr. *Jurin*, with what we have ſeen of Lime-water in the Caſe of Mr. *Millar*.

(*x*) See No. 76. above.
(*y*) See No. 62. above.

Dr. *Jurin*'s Stone in his Bladder ſeems to have been but of two or three Months ſtanding when he began his Medicines; whereas Mr. *Millar*'s was of above fifteen Months. Dr. *Jurin* took Soap-leys in very large Doſes for near five Months before he paſſed any Stones; and, after taking them near ſeven Months, does not ſeem to have been perfectly cured (*z*): Mr. *Millar*, in ſeven Weeks after he began to drink Lime-water, voided one Stone, as in three Months he did another, and has ever ſince been perfectly well. Mr. *Millar* had no Pain upon uſing the Lime-water (*a*), but in few Days began to perceive a gradual Abatement of all his Complaints; while Dr. *Jurin* had his Pains conſiderably increaſed by the Soap-leys at firſt; nor does he ſeem to have had any ſenſible Eaſe, till after uſing them above four Months.

By what has been juſt now ſaid, I would not be thought to reject the Uſe of Soap-leys altogether in the Cure of the Stone; on the contrary, I imagine, that ſmall Doſes of this Liquor, taken along with Lime-water (*b*), may contribute greatly to the Diſſolution of the *Calculus*; only I would not chuſe to give it in ſuch large Quantities as to occaſion great Pain or Heat of Urine to the Patient; or in any Caſe where there are Ulcerations or Sores in

(*z*) See his Caſe, p. 14.

(*a*) Nor is Mr. *Millar* a ſingle Inſtance of this: For of all the Patients, for whom I have ordered Lime-water in the Stone, I do not remember that one had his Pains increaſed by it.

(*b*) See Sect. xi. No. 1. above.

in the Bladder. And, inſtead of common Soap-leys, I would recommend the *Lixivium* of N° [64.] made with purified Potaſh and Shell-lime, for the Reaſons there offered.

Quick-lime, as we have already obſerved, has been a long time looked upon by the Chymiſts, as containing in it a powerful Remedy againſt the *Calculus*. The Powder of calcined Egg-ſhells, which makes a principal Part of Mrs. *Stephens*'s Medicines, is commended by *Barbette* as of incomparable Uſe in all Suppreſſions of Urine from the Stone or Gravel (*c*): And the Aſhes of burnt Snails, another Ingredient in her Medicines, are mentioned near ſeventeen hundred Years ſince, by *Pliny*, as a good Remedy againſt the Stone (*d*). But, from the above Experiments, it ſeems reaſonable to think, that the Virtues, whether of Stone or Shell Lime, may be more ſafely conveyed into the Blood by means of Lime-water than any way elſe; for Lime, freſh from the Fire, is too fiery and corroſive to be taken into the Stomach; and, after it is ſlaked by two or three Months keeping, as Mrs. *Stephens* directed, it gains in Mildneſs

(*c*) *In omnimoda urinæ a calculo ſuppreſſione, teſtæ ovorum calcinatæ ad ſcrup.* ii. *vel drach.* i. *aſſumptæ; omnia reliqua medicamenta præcedunt.* Barbette *Praxis, lib.* 4. *cap.* 8.

(*d*) *Eaſdem (ſciz. Cochleas) exemptas teſtis tritaſq; tres in vini cyatho bibi, ſequente die duas, tertio die unam, ut ſtillicidia urinæ emendent.* TESTARUM VERO INANIUM CINEREM AD CALCULOS PELLENDOS. Plin. Hiſtor. natural. Lib. xxx. cap. viii.

Mildneſs only what it loſes in Virtue (*e*); though, even after all, it is a Medicine which ſeems to be neither innocent nor agreeable.

Soap is not only inferior to Lime-water, as its lithontriptick Virtue is leſs, but as it abounds with an alcaline Salt, which, when the Soap is taken in large Quantities, occaſions great Pains in the urinary Paſſages, and is of bad Conſequence if there are any Ulcerations in theſe Parts. Nay, the ſtimulating Quality of Soap is ſo remarkable, that although Lime-water, with a ſmall Proportion of Soap-leys, ſoftened with a little Starch, gave no Uneaſineſs when injected into the Bladders of Dogs; yet a ſmall Quantity of Soap diſſolved in the ſame Lime-water, never failed ſoon after being injected, to cauſe great Irritation; nor was the Starch of any Avail to prevent this (*f*).

But further, how ſtrongly ſoever ſeveral of the above mentioned Medicines may be endued with a Virtue of diſſolving the Stone; yet Lime-water ſeems to have this inconteſtable Advantage, that it may be injected moſt ſafely into the Bladder; and by being applied immediately, and unchanged to the very Surface of the *Calculus*, it may be well expected to haſten its Diſſolution very conſiderably.

Upon the whole, we have found in Lime-water, particularly in that which is made with Oiſter or Cockle Shells, a *Menſtruum* for the *Calculus*, ſo innocent and mild, that it may be taken

(*e*) See No. 20. above.
(*f*) Langriſh's phyſical Experiments, p. 30.

taken into the Stomach without any Harm, and injected into the Bladder without the leaſt Danger of corroding it. Such a *Menſtruum* as this the learned *Boerhaave* did not deſpair of being one Day diſcovered, as he had found the Spirit of Rye-bread poſſeſſed of a ſurpriſing Power to diſſolve certain Stones, though it did not injure any Parts of the human Body *(g)*.

I don't know whether it will be thought worth while juſt to obſerve, that Lime-water appears, from the above Experiments, to be poſſeſſed of all the Qualities which *Van Helmont* required in a Medicine that ſhould ſafely diſſolve the Stone: As,

1. *Aptum ſit in urinam mutari, ut ſcilicet locum affectum tangat.* That Lime-water alters the Nature of the Urine, and communicates its Virtues to it, appears from *Exper.* under Sect. ii.

2. *Habeat in ſe poteſtatem ſolvendi repagula calculi.* See *Exper.* under Sect ii. and iii.

3. *Poſſideat iſtud in proprietate ſpecifica.*

4. *Sit ſubtile, ut quaquaverſus eat, ſuumque eminus objectum demoliri queat.* See Sect. ix. N° 57. 59. and 61.

5. *Amicum ſit naturæ, ne ſcilicet cuncta pervertat.* See Sect. iii. N°. 19. and Sect. ix. N° 61.

SECT.

(g) Boerhaave Chemia., vol. 1, *de Menſtruis.*

SECT. XIV.

The diſſolving Powers of the Menſtrua.

If, in the foregoing Experiments, the Weights of the ſeveral Pieces of the ſame *Calculi*, and the Times they were immerſed in the different *Menſtruums*, had been all equal, the Strengths of the *Menſtruums* would at firſt ſight have appeared; but ſince the Caſe is otherwiſe, and I did not advert to this Inconveniency ariſing from it, till it was too late; in order to make it up as much as poſſible, I ſhall here ſubjoin a Table of the Proportions which the diſſolving Powers of the *Menſtruums* for the *Calculus* in the above Experiments bear to one another; but, previous to it, I ſhall briefly mention the Grounds upon which it is built.

I ſuppoſe that the Times in which different Pieces of the ſame homogeneous *Calculus* will diſſolve in any *Menſtruum*, to be as their Surfaces. And, ſuppoſing their Surfaces to be as the ſquare Roots of their Weights or Quantities of Matter, (which would be exactly true were they all either perfect Cubes or Spheres, or their Figures exactly ſimilar), the Times required for two different Pieces of the ſame *Calculus* to diſſolve in any *Menſtruum* will be, *cæteris paribus*, as the ſquare Roots of their Weights.

If

If the Weights of two Pieces of the ſame homogeneous *Calculus* are equal, and the Times which they are immerſed in different *Menſtruums* are alſo equal, the Powers of the *Menſtruums* will be as the Quantities diſſolved.

If the Weights and Quantities diſſolved are equal, the Powers of the *Menſtruums* will be inverſely as the Times during which the *Calculi* were immerſed.

If the Quantities diſſolved and Times of Immerſion of two Pieces of the ſame *Calculus* are equal, the Forces of the *Menſtruums* will be inverſely as the ſquare Roots of their Weights.

If the Times, Weights and Quantities diſſolved are unequal, the Powers of the *Menſtruums* will be as the Quantities diſſolved directly, and as the Times and ſquare Roots of the Weights inverſely. Thus, ſuppoſing *m*. M. to be the *Menſtruums*, *q*. Q. the Quantities diſſolved, *t*. T. the Times the *Calculi* were immerſed, and *w*. W. their Weights, then

$$m : M :: q \times T \times \sqrt[2]{W} : Q \times t \times \sqrt[2]{w}.$$

If two *Calculi* of different Textures be put in the ſame *Menſtruum*, the Hardneſs of the one will be to that of the other, as the Times and ſquare Roots of the Weights directly, and as the Quantities diſſolved inverſely. If $m = M$, then

$$h : H :: t \times \sqrt[2]{w} \times Q : T \times \sqrt[2]{W} \times q.$$

Hence, by comparing Experiment 15, and 16. the Hardneſs of the *Calculus A* is to that of *B*, as 380 to 406; and this it was neceſ-

ſary

ſary to take notice of, as, in ſeveral Articles of the following Table, an Allowance was made for this Difference in the Hardneſs of theſe two Stones.

TABLE.

Menſtruums.	*Diſſolving Powers.*
Stone Lime-water, *Exper.* 11. —	202
Oiſter-ſhell Lime-water, *Exper.* 16.	583
Cockle-ſhell Lime-water, *Exper.* 17.	583
Lime-water made with Oiſter-ſhells that had lain 35 Days after calcining in the open Air, *Exper.* 20. ——	215
Oiſter-ſhell Lime-water and Honey, *Exper.* 34. —— ——	146
Oiſter-ſhell Lime-water and Sugar, *Exper.* 35. —— ——	340
Stone Lime-water in cold Digeſtion, *Exper.* 13. —— ——	091
Oiſter Lime-water in cold Digeſtion, *Exper.* 18. —— ——	229
A Solution of Soap in common Water, *Exper.* 70. —— ——	143
A Solution of the external Part of Soap, *Exper.* 73. —— ——	079
A Solution of Soap in Stone Lime-water, *Exper.* 66. firſt Trial —— ——	406
Second Trial —— ——	494
Exper. [66.] — ——	328
A Solution of Soap with Sugar, *Exper.* 71. —— —— ——	134
A Solution of Soap with Honey, *Exper.* 71. —— —— ——	067

Lime-

Menſtruums.	*Diſſolving Powers.*
Lime-water made by pouring a weak Solution of Soap on calcined Oiſter-ſhells, *Exper.* [67.] — — —	681
Lime-water made with a ſtronger Solution of Soap, *Exper.* [67.] — —	1003
Potaſh and Stone Lime-water boiled, *Exper.* 63. — — — —	0178
A Ley of Potaſh and Quick-lime, *Exper.* 64. — —	3449
Another Ley of the ſame kind, *Exper.* 64. — —	1768
Common Soap-leys, *Exper.* [64.] —	3671
A Ley of Oiſter-ſhell Lime and Potaſh, *Exper.* [64.] — — —	5874
A ſtronger Ley of Potaſh and Oiſter-ſhell Lime *Exper.* [64.] — —	7343
A Maſs of Soap, Salt of Tartar, and Quick-lime diſſolved in ſixteen times its Weight of Water. *Pag.* 253.	308
Strong Lime-water made with freſh calcined Oiſter-ſhells one *lib.* and boiling Water ſix *lib. pag.* 253. — —	666
Aqua fortis ſimplex in cold Digeſtion, *Exper.* 64. — — —	858
And, ſuppoſing its diſſolving Power to be increaſed in a digeſting Warmth, in the ſame Proportion as that of Oiſter-ſhell Lime-water, then the diſſolving Power of *Aqua fortis ſimplex* in warm Digeſtion will be — —	2184

Edinburgh, Nov. 6. 1742.

POSTSCRIPT.

AS I conceive the following Hiſtory, incompleat as it is, may ſerve conſiderably to recommend the Uſe of Lime-water in the Stone, I have ſent it to be publiſhed, (if you think it deſerves a Place in your Collection) as an *Appendix* to a former Paper upon this Subject.

James Litſter, of *Macky's-Mill*, in the County of *Fife*, aged fifty ſeven, about nine Years ago, was much hurt by a ſevere Fall upon a Millſtone; and, after that, began to be troubled with Gravel in the Kidneys and *Ureters*. At this Time he had a great Pain in one of his Kidneys, and Stoppage in his Belly, like an Iliac Paſſion. After a Clyſter, he had Paſſage, and was eaſier, and the Stone or Stones paſſed into his Bladder: But he did not obſerve that he voided any with his Urine, till a long Time after: And, ever ſince this, he has had all the Symptoms of a Stone in the Bladder. He has great Pain in making Urine, is not able to uſe Exerciſe, and, upon Motion, feels the Stone pricking him in his Bladder. Riding at a Trot gives him remarkable Uneaſineſs; and, after it, or much Walking, his Urine is generally tinged with Blood.

He has been ſubject for ſeveral Years to have his Symptoms at certain Periods exaſperated. During the Fit, he is in great Diſtreſs; and his Urine, which he has an Inclination to make every two or three Minutes, comes away in Drops, with ſevere ſtimulating Pains.

The

The Fits generally laſt three, ſometimes four Weeks, and return after an Interval of fourteen or twenty Days.

He took Mrs. *Stephens*'s Medicines for two Months, without any Benefit; but found his Pain increaſed by them, his Stomach put out of order, and Appetite greatly deſtroyed.

He has alſo uſed Soap for ſome time, to the Quantity of three fourths of an Ounce a Day; but without any ſenſible Benefit.

I adviſed him, along with the Soap, to drink Lime-water made with calcined Cockle-ſhells, beginning with two *Engliſh* Pints; and, if it agreed with him, to increaſe the Quantity to three Pints or more every Day.

Upon the 1ſt of *June* 1742, a few Days before he began to uſe the Lime-water, he was attacked with a ſevere Fit of Pain, and Difficulty of Urine; which laſted twenty Days; in which Time he paſſed a good Deal of tough Slime. But, in eight or ten Days after this was over, he found himſelf eaſier than he had been for a Year before, and made his Urine more freely, and with leſs Pain.

July 2. Having uſed the Lime-water ſcarce four Weeks, he rode fourteen Miles to a Market. During the Riding, he felt ſome Pain in his Bladder. Notwithſtanding which, next Day, he was quite eaſy; whereas, formerly, if he had made any Journey on Horſe-back, he was ſure the Day following to be in the utmoſt Diſtreſs, and to continue ſo for ſeven or eight Days.

When he ſtoops down, or makes any ſudden Motion, he ſtill feels the Stone puſhing

him in the Bladder; but not near ſo ſharp as uſual. His Urine, ſince he uſed the Lime-water, depoſites a great deal of whitiſh Sediment; and he thinks it has given him a better Appetite than he has had for ſeveral Years paſt.

From the 2d of *July*, he drank above three Pints of Lime-water every Day; and was very eaſy till the 20th of that Month; when he had a Fit as uſual; but it laſted only eleven Days: And then he had only Pain in making his Urine; which, however, was leſs ſevere than what he had formerly been uſed to have. His Belly being generally coſtive during the Fit, I ordered him an Infuſion of *Senna*; from which he had conſiderable Relief.

He continued very well all the Month of *Auguſt*; and walked, upon the 20th, ſix Miles in a few Hours, without any Pain or Trouble: Whereas, for ſome Years paſt, he could not walk, even one Mile without much Pain.

Upon the 1ſt of *September*, he found his Urine much obſtructed, and had a Fit which laſted nine Days: But, though his Provocations to Urine were frequent, and the Difficulty in making it conſiderable; yet, after voiding a few Drops, he was eaſy, and had no ſtimulating Pains. From this Time, to the End of *October* laſt, he was as well as if he had had no Stone, was able to go about his Buſineſs, from which he had been long laid aſide, and was fit for any Work that did not require great Strength. He can ride now as well, either at a Trot or Gallop, as ever,

and

and never finds any thing pricking him in his Bladder, not even when he has the Fit. From the Beginning of *July* he made no uſe of Soap, and found no other Inconveniency, than that he thought the Lime-water bound his Belly a little more for the want of it. He is ſo ſenſible of the Benefit he has had by drinking Lime-water, that he is reſolved to perſiſt in it, in hopes of a compleat Cure (*h*).

I have had occaſion to order Oiſter-ſhell Lime-water for many other Patients afflicted with the Stone; but have not yet met with an Inſtance except one where it was drank to the Quantity of three *Engliſh* Pints a Day, and any tolerable *Regimen* obſerved, without the Patient's finding himſelf in a few Weeks ſenſibly eaſier. When the Stone is ſmall, this will happen moſt remarkably as was the

(*h*) From *October* 1742, *James Litſter* continued drinking the Lime-water near two Years, to the Quantity of three *Engliſh* Pints a Day; during which Time, he paſſed great plenty of ſandy Stuff, was remarkably eaſy, and went about his ordinary Buſineſs, without any Pain or Interruption. After *September* 1744, he gave over the conſtant Uſe of it: But, when after catching Cold, or great Fatigue, he had Difficulty of making his Urine, with ſome Pain, and paſſed a good deal of Slime, with ſome Sand; upon having recourſe to the Lime-water in ſmaller Quantities, he was ſoon relieved. Since the Year 1744, he has, upon Motion, felt nothing weighty like a Stone in his Bladder (as he uſed formerly to do) although he has often walked ten Miles a Day, made pretty long Journeys on Horſeback, and frequently rode at a Gallop. So that it ſeems probable, that the Stone, if yet undiſſolved, is at leaſt conſiderably diminiſhed in its Bulk, and ſoftened in its Surface. It may be worth while to obſerve, that this Patient, notwithſtanding his drinking Cockle-ſhell Lime-water for above two Years, to the Quantity of three *Engliſh* Pints a Day, had neither his Appetite nor Digeſtion any way impaired, nor his Health injured by it.

Caſe with Mr. *Miller*; but, if it is very large, even after its Surface is ſoftened, and the rough Points worn off it by the Lime-water, it is not to be imagined, but that by its Bulk it muſt ſometimes give Uneaſineſs, eſpecially in making Urine: But the Patient has this to comfort him, that while he continues his Medicine, the Stone is daily growing leſs. And there is one ſure Mark by which any one taking Lime-water, Soap, or Soap-leys, for diſſolving the Stone, may know if his Urine is ſo far changed, as not to be further capable, at leaſt of furniſhing any new Matter for increaſing its Bulk, *viz.* if, by the Uſe of theſe Medicines, the Sediment of his Urine, from a browniſh Colour, becomes white.

I ſhall only make one Obſervation upon this Hiſtory, which the moſt rigid Infidels, with regard to the Diſſolution of the Stone, muſt acquieſce in; and that is, Suppoſing Lime-water could not diſſolve the Stone; yet, ſince it is capable of giving ſuch Eaſe and Quiet to thoſe who labour under it, whether would it not be more adviſable for ſuch, eſpecially if advanced in Years, to reſolve upon drinking a Bottle of this every Day, during their whole Life, than ſubmit to one of the moſt cruel, and, at the ſame time, not the leaſt dangerous Operations in Surgery?

LXX. *The*

LXX. *The Dissection of a calculous Person; by the late Mr.* JOHN PAISLEY, *Surgeon in* Glasgow.

I Opened the Body of a Youth last *November*, who died of a Stone in the Bladder; in which some Things appeared worthy of Observation. But, as I had never seen him before I was called to open him, I can only relate the Symptoms that preceeded, as I had them from his Parents. They acquainted me, that, from his Infancy, he was troubled with the Gravel, especially from the Time he was three Years of Age, he then taking severe Fits, which lasted three, or sometimes four Weeks; and then he was free of them for as many Months. These Fits recurred frequently, until he was eight Years old. In the Fit he complained of a great Inclination to make Water, without being able to make any, except a little at a Time; other whiles it forced itself away involuntarily: In both Cases, with great Pain about the *Os pubis* and *Anus*, and Pain and Heat in the *Penis*; so that he could make no Water without going to Stool; which at length brought a *procidentia ani* upon him. He complained principally of violent Pains in his Sides, especially the right Side; and was continually handling and squeezing the Yard; which generally made his Arms so feeble, that, by the Time the Fit was over, he could make no use of them. They observed his Fits were always worst about the Beginning of Winter, especially if the Season was rainy, it seldom attacking him till the Rains began. He used to be free of them some Months in the Summer; had his

his Appetite good, only troubled with a Drought; and did not grow in Stature in proportion to his Age.

He was ſounded, when eight Years old, by a very able and expert Surgeon; who could neither diſcover by the *Anus* nor *Catheter*, whether he had a Stone or not. After which he was free of his Fits for near a Year, having only ſome gentle Returns; which made them fancy he had no Stone: Then the Fits recurred as violent and frequent as before; and thus continued till he was fifteen; when he was cut for the Stone, and a pretty large round one taken from him, ſmooth on one Side, and rough on the other, about an Inch and a half diameter, made up of a great many *Laminæ*. The Wound healed up in about ſix or ſeven Weeks: And for three Quarters of a Year he was almoſt quite free of his Diſtemper; when again it returned with great Violence, having, beſides the Symptoms already mentioned, a great Pain in the Place where the Wound had been made, whenever the Fit was upon him; and he uſed continually to croſs his Legs, and take them off again by turns; which is not, ſo far as I know, exactly deſcribed by any Author, but *Celſus (a)* and *Lommius (b)*. The firſt ſays, *Quidam etiam cum torquentur pedes inter ſe, ſubinde, mutatis vicibus, implicant.* His Urine was always thick and white, and frequently with Sand in the Bottom, and, when it ſtood any time, turned like a white Gelly. If he drank any thing liberally, it greatly augmented his Pain, eſpecially if he took Brandy,

(a) Lib. 2. cap. 7.
(b) Obſ. med. l. 2. § de calculo veſicæ.

Brandy, or any ſtrong Liquor. A tight Bandage, from the Haunches to the Arm-pits, afforded him great Relief to the Pains in his Sides; which was what he complained all along moſt of.

He took a violent Fit in the Beginning of *September* laſt; and then, for the firſt time, loſt his Appetite, his Drought increaſing, and all his other Pains with a Looſeneſs for a Fortnight before his Death. Though he was twenty Years of Age, he was no bigger than one of ten or twelve.

Upon opening his Body, all the Parts in the Abdomen appeared ſound, but much emaciated, except the Kidneys; which were very large and flaccid, and divided, to Appearance, into Lobes, in the ſame Manner as in a *Fœtus*. The one on the right Side was near five Inches long, three Inches broad, and two thick. Its ſuperior convex Part was ſo intimately grown to the inferior Edge of the Liver, and to all that Part of the Colon which lay immediately above it, that it was almoſt impoſſible to ſeparate them without cutting into the Subſtance of the one or other, the whole Fat and Membranes being entirely conſumed. Upon the ſuperior Point, next to the *Glandulæ renales*, there was, to Appearance, a larger Lobe than any of the reſt, or rather a Tumor about the Bigneſs of a Walnut; which felt very ſoft, and as having Matter fluctuating in it, in the ſame Manner as in any common Abſceſs. Upon opening the Kidney, there flowed out a great Quantity of a ſlimy whitiſh Matter like *Pus*. The Tumor immediately ſubſided, and the whole Kidney collapſed, and looked like a thin Bag; the outer Subſtance of it being little

above

above an eighth of an Inch thick in moſt Places, though in no Place near to the natural Thickneſs of one either of his Bigneſs or Age. Then the Tumor appeared to be only an Enlargement of one of the Productions of the *Pelvis* that ſurrounded the *papillæ uriniferæ*; the whole of the *Pelvis* being much enlarged, and its Coats very thick, as was the *Ureter* all the way to the Bladder. The Diameter of the *Ureter* was more than half an Inch, or much about five eighths of an Inch, full of the ſame purulent Matter as the Kidney.

The left Kidney was rather larger than the right, being full five Inches and a half long, and much the ſame in Breadth and Thickneſs with the other, and had the ſame Appearance as to Lobes or Tumors; only, the ſuperior Part was more pointed, and had a larger Tumor than the other, and contained the ſame kind of Matter. The *Pelvis* was enlarged and thickened in its Coats in the ſame Manner as the other. The *Ureter* was near of the ſame Dimenſions; the Fat and Membranes that uſually cover the Kidneys being likewiſe entirely conſumed. It was ſo firmly grown to the Part of the *Colon* that lay upon it, and to the neighbouring Parts, that it was ſcarce poſſible to ſeparate them; the Subſtance of the Kidney being much of the ſame Thickneſs.

The *Veſica Urinaria* was greatly contracted, cloſely ſurrounding a granulated priſmatical Stone, of a whitiſh Colour; the largeſt of the Grains of which it is compoſed being ſcarce ſo big as that of an ordinary ſmall Pin-head. The Stone is about an Inch and a Quarter long, and

an

an Inch broad in each Side. The Coats of the Bladder were more than a Quarter of an Inch thick; and in it there was a small Quantity of the purulent Matter, and some Sand.

LXXI. *An uncommon Tumor round the lower Part of the Bladder; by the late Mr.* JOHN MACGILL.

AN old Man, subject sometimes to Fits of the Gravel, and to *Dysuria*, who had passed some small Stones, was seized with a total Suppression of Urine, without any Fever, or other violent Disorder. Diureticks, Purgatives, Clysters, Baths, *&c.* were tried without Relief. Hollow Catheters of several Forms were employed to evacuate the Water by different Surgeons; who plainly introduced the Catheter beyond the *Sphincter vesicæ*, into a Cavity from which sometimes a very small Quantity of clear Liquor ran out. But then the End of the Instrument was stopt by some soft Obstacle, and no Urine came away, while his Bladder was gradually stretching to a very great Extent, and the Patient was in very violent Pain. To evacuate the collected Urine, I, by Advice of the other Gentlemen who visited him, plunged a Trocar thro' the *Linea alba* and Bladder, and took away three Pounds of fetid acrid Urine, of the Colour of Moss-water. The Obstruction, however, at the Neck of the Bladder still continuing, notwithstanding many different Methods to relieve him, he died.

When

When the dead Body was examined, both the Kidneys appeared to have a flabby looſe Texture. At the Beginning of the left *Ureter* there were ſeveral bloody Spots, which looked like the Orifices of ruptured or diſtended Veſſels. This Ureter, at its Exit from the Kidney, was large enough to contain a Cheſnut; and the whole Ureter was dilated as far down as the Bladder.

The Bottom of the Bladder was as high as the Navel, and carried the *Septum* of the *Peritoneum* along with it. The Bladder was all of a black Colour, and in a gangrened State. The lower Part of it was ſurrounded with a very firm white Tumor, near to the Conſiſtence of Cartilage; which was continued more than two Inches up from the *Proſtata*, being more than an Inch thick every where round. There was a particular Excreſcence which roſe forwards from the ſuperior Extremities of the back Part of this Tumor an Inch and a half, and thruſt the Coats of the Bladder before it, till they were cloſely applied to the anterior Part of the Bladder ſo as to form a Partition between the upper and lower Part of the Bladder.

In the upper Sac of this divided Bladder there were contained a Pound and a half of a putrid bloody Liquor, and ten ſmall Stones, the largeſt of them being about the Size of a large Hazelnut.

LXXII. *An Account of bloody Urine, from a Worm in the Bladder; by Dr.* EDWARD BARRY, *Physician at* Dublin, *and F. R. S.*

MR. *Thomas Hutchins*, a Gentleman who lives in *Bantry*, in the West Part of this Kingdom, aged fifty Years, came to me for Advice on the 17th of *June* 1737. His Case was then attended with the following Symptoms.

About five Years ago, while he enjoyed perfect Health, and without any previous Complaint, or Cause which he could assign, first observed his Urine coloured with Blood. This Discharge, since that Time, has continued in his Urine; nor has he ever perceived any intermission, except when drinking very freely, he has sometimes observed it clear, or but lightly tinctured, after often making Urine in large Quantities; but it soon afterwards returned to its usual Standard of Colour. Neither Exercise, Medicines, nor Diet, (as near as he can judge), had remarkably increased or diminished the Quantity of Blood discharged every Day.

When I examined his Urine, it was obscurely and deeply coloured; the Sediment which subsided was more intensely red, and a great Part of it, when the Urine was poured off, was lightly coagulated. The Quantity of Blood which subsided in all the Urine collected in the Space of twenty four Hours, without considering what remained mixed with it, was at least equal to two Ounces. He had often observed, that when he divided the Urine he made at any one Time in two different Glasses, what he first discharged

ged was more highly tinctured than what followed afterwards. He never voided either Stone or Gravel, never complained of any Pain in Kidneys, Ureters, Bladder or Urethra. His Conſtitution was naturally very ſtrong, which made him leſs ſenſible for ſome time of any Inconvenience from this Evacuation; and having uſed ſeveral Medicines to remove it, but in vain, he acquieſced under it, and purſued his uſual Way of Life. About three Years ago he had a Fever; and Mr. *Maxwell*, a Surgeon in the Army, who attended him in the Country, and who happened to be in Town while he was under my Care, told me he could perceive no great Difference in his Urine during the whole Courſe of the Fever. From that Time he became more ſenſible of a Decay in his Strength, which gradually decreaſed. When I viſited him, he had a Swelling in his Legs, a Fulneſs and Tenſion in his Abdomen, like a beginning *Aſcites*, his Eyes and Skin tinctured with a yellow Colour, a Laſſitude and Difficulty of breathing on Motion, a total Loſs of Appetite, a conſtant Thirſt, with a quick Pulſe, which remarkably increaſed every Evening, not unlike a Paroxyſm of an intermittent Fever.

In theſe difficult Circumſtances, I preſcribed the following Regimen, with a View rather of moderating the Progreſs of the Symptoms, than with any Expectation of removing this obſtinate and unaccountable Diſorder.

After the Uſe of an Emetick, he took next Night ten Grains of *Calomel*, and the ſucceeding Morning two Ounces of this Infuſion:

℞ *Hier.*

℞ *Hier. Picræ*, Dr. vi.
Rad. Rhei. Dr. iii.
——*Jalap.* Dr. i. *& sem.*
Cochin. Indic.
Sal. Absynth. aa. Dr. i.
Infund. frigidè in Vin. alb. Lusitanici fortioris, Unc. xvi. *Colaturæ adde*
Tinct. Myrrhæ, Unc. ii.

Thus prepared, he continued to take three of the following Pills:

℞ *Gum. Ammon.* Dr. ii.
Sapon. Venet.
Chalyb. cum Sulph. p. pt. aa. Dr. i.
Rhei Elect. Pulv. Dr. i. *sem.*
Sal. Tachen. Dr. *sem.*
Ol. Juniperi, Gut. vi.
Terebinth. purissim. q. s. m. f. Pillul. xii. *ex sing. Drachmis cap.* 3. *hor. 7ma. matut. & 6ta p. m. superbibendo* Unc. iii. *seq. Decoct.*

℞ *Rad. Curcum.*
Rub. Tinctor. aa. Dr. vi.
Cort. Peruv. Unc. i.
Cum aq. decoct. sub finem adde Baccar. Junip. Unc. *sem. Colaturæ* Lib. ii. *exhibe.*

These he took Morning and Evening, drinking three half Pints of *Pyrmont Spa-waters* after them in the Morning, and half a Pint in the Evening, at a proper Distance. Two Hours before Dinner he took thirty Drops of *Elix. Vitrioli Mynsicht.* in a Glass of *Old Hock.*

In a Week's Time I repeated the *Calomel* and the purging Infusion. About Four next Morning he complained of a severe Gripping, purged

largely, lay down and ſlept till Seven, when he made a Glaſs full of Urine of a natural Colour, and before Ten he made two Glaſſes more of ſuch Urine. Mr. *Maxwell*, who viſited him that Morning, obſerving ſomething that appeared particular in the laſt Glaſs, ſent for me immediately. I poured off the Urine, and in the Bottom found a *Worm* above an Inch in Length, of the Thickneſs of the ſmalleſt Sort of Eel, and not unlike it in Shape, ending in a ſharp-pointed Tail. I received it on a China-plate, waſhed it gently with Water, which it lightly tinctured, when it firſt touched it, with a bloody *Mucus* which adhered to it. We could without a Glaſs diſcover its Mouth, Eyes, and circular Fibres, which appeared very diſtinctly when magnified. It was very firm, and of a red Colour; from whence I conclude it not to have been long dead; for in the Evening it was of a more pale Colour. His Urine continued all that Day and the next free from any Mixture of Blood; in which Time he made ſeven large Glaſſes. The ſucceeding Morning his Urine was lightly coloured, and in the Evening it was as fully loaded as uſual. Next Day it diſappeared, and returned again three Days afterwards. This Intermiſſion was gradually greater, and the Return more moderate; and the bloody Tincture, in three Weeks, entirely ceaſed. It was obſervable, that when the Urine was free from Blood, a Sediment like the white of Eggs ſubſided in his Urine, and continued for ſome time, though in a leſs Quantity, after the Evacuation of Blood entirely diſappeared. Afterwards, by continuing the Uſe of a Chalybeat Wine, with the

the *Gum* Pills, taking *Rhubarb* once a Week, and obſerving an exact Regimen of Diet, all the other Symptoms were removed. It is now near a Year ſince he parted with his troubleſome Companion; and he enjoys, at this Time, a perfect healthy Habit of Body.

Though there are ſome ſurpriſing Inſtances, in Authors, of the various Appearances of Worms; yet I think this ſo ſingular in its Circumſtances, that I hope you will not think I exceed the Bounds allowed in your *Eſſays*, if I endeavour to point out the Cauſe and Seat of this uncommon Diſorder; eſpecially ſince from thence a *Pathognomic* Character may be fixed, by which ſuch an Appearance, whenever it happens, may for the future with ſome Degree of Certainty be known, and a Method of Cure be more directly applied. How far the Medicines I directed contributed to the Diſcharge of this Worm, or may be ſerviceable in ſuch a Caſe, I will not determine; but whatever Succeſs attended them, was more owing to Chance than Judgment.

As he had no Pain, it will be ſomething difficult to fix the Seat of this Worm. When the Diſcharge of Blood is from the Kidneys or Ureters, the Urine, though red, will be generally tranſparent. This was always obſcure, and the Sediment immediately ſubſided, which falls more ſlowly in the former Caſe; we muſt therefore fix it in the Bladder; and, as the firſt Part of the Urine was more obſcure than what came off at the latter End, it was probably near its Neck. But another greater Difficulty attends this Situation: it could not lie looſe in the Bladder, with its Mouth fixed

conſtantly to one Part; nor does it ſeem to have eroded any Veſſels, or produced any Wound, which muſt have been attended with *Pus:* It muſt therefore have been originally lodged in one of the laſt Ramifications of an Artery, which exhales into the Bladder; which gradually enlarging with its Size, occaſioned a conſtant oozing of Blood, in the ſame Manner as the menſtrual Diſcharge is produced, where, by a Dilatation from Plenitude, the ſame Veſſels which commonly exhale a thin Fluid, give Admittance to Blood. And that ſuch was his Caſe, appears from the Procedure of the Symptoms. The immediate Diſappearance of Blood after the Diſcharge of the Worm, muſt have been owing to ſome coagulated Blood lodged in the extreme Orifice: For neither could a Wound ſo immediately heal, nor a dilated Veſſel recover its Tone. When this putrified and looſened, the Diſcharge returned; this frequently happened. At length a gelatinous Humour, like the white of an Egg, only ſubſided in his Urine, which was the Serum of the Blood, which the Veſſel ſtill admitted; till, its Contraction and Tone being gradually reſtored, all Appearances of that Nature ceaſed.

The Generation of *Worms* in the firſt Paſſages is not very obſcure where a mucous *Nidus* gives them a proper Lodgment, eſpecially in weak and languid Conſtitutions; but it is ſomewhat difficult to conceive how they, or their more tender *Ova*, can ſafely arrive to the diſtant Veſſels of the Body. It is certain we receive many ſmall Animals and their *Ova* in our Food, which in ſtrong Conſtitutions are in the firſt Paſſages digeſted

digeſted and deſtroyed; and if they, or any of their *Ova*, paſs through the Lacteals, and mix with the Blood, from the various Attrition and Motion in the Courſe of Circulation, they are generally deſtroyed, or may paſs off in the Secretions, and be diſcharged out of the Body. If this *Ovum* had been protruded a little farther, it would have fallen into the Cavity of the Bladder, and been diſcharged with the Urine: But it happened to ſurvive all the Shocks it met with, and to fix in the Extremity of this Veſſel, to find there a proper Seat and Nouriſhment to produce this uncommon Appearance, and, though ſo ſmall in its Origin, to reduce a *Hercules* to the Weakneſs of an Infant.

Bloody Urine in moſt Caſes is owing to Stones, or Gravel wounding the Veſſels; ſometimes to the Urine being loaded with acrid Salts, which may act like a Cauſtick, abrade the *Mucus* of the urinary Paſſages, and erode the Veſſels; or, in general, to whatever preſſes on their Veſſels, or determines the Blood there, with a Force greater than their Reſiſtance. But as ſuch Cauſes never act equally at all times, a Diſcharge from hence of Bloody Urine appears in Paroxyſms, which are more intenſe or mild, according to the Circumſtances then producing them, and are generally attended with Pain. But when the Diſcharge of the Blood with the Urine is conſtant, equal, and unattended with Pain, without any Symptoms of calcular Concretions, we may, I think, ſafely for the future aſſign ſuch an Evacuation to a Worm lodged in the Extremity of one of the Arteries.

LXXIII.

LXXIII. *A* Dropſy *and large* Veſicæ *in the* Ovarium; *by Mr.* JOHN PAISLEY, *Surgeon in* Glaſgow.

A Widow Gentlewoman, who, when ſhe was bearing Children, had been much troubled with Coſtiveneſs and Piles, and had been much accuſtomed to Family-purgatives, which ſhe was obliged afterwards to continue, and who, in Labour of a Child eighteen Years ago, had got an *Exomphalos*, had many Years obſerved a more than ordinary Bigneſs in her Belly. In *July* 1734, ſhe complained of ſome Pains in her Belly, attended with feveriſh Symptoms, which were ſoon removed. In *March* 1735, ſhe complained to me of her Belly having increaſed conſiderably for ſome time paſt, with a Weight and Tenſion in the lower Part, which hindered her to walk ſo eaſily as ſhe uſed to do. Upon preſſing this Part, I found it very much ſwelled and hard, and could eaſily diſtinguiſh a large round Body in the Cavity, which yielded to, and fled from the Preſſure, and returned whenever the Preſſure was forborn; and I could lift it up with my Hands, ſo as to be certain it was no Tumor in the containing Parts.

She had Advice of ſeveral Phyſicians, and took a great Variety of Medicines to no purpoſe; for the Swelling continued to increaſe, ſhe waſted, and at laſt died, aged fifty Years, in *November* 1735.

I thruſt a *Trocar* into the right Side of the Belly, where it was moſt prominent, and drew off thirteen *Scots* Pints, or ſix and a half *Engliſh*

liſh Gallons of Water, which appeared very thin and clear as it was running out; but when all collected in a Veſſel, it had a good deal of oily Matter ſwimming a-top. Upon laying open the Body, we could ſee almoſt no Fat in the *Tunica cellulosa*, which in ſeveral Places reſembled the *Muſculi cutanei* of Quadrupedes. The Muſcles of the *Abdomen* were as thin as Parchment.

The *Omentum* was forced far up towards the *Thorax*, except one ſmall Production, which entered the *Hernia* at the Navel, and the whole of it was thin, with little Fat.

All the other *Viſcera* were puſhed greatly upwards upon the *Diaphragm*, by a large irregular Body, which poſſeſſed all the lower Part of the *Abdomen*. Betwixt this Body and the *Pubis* there was a large empty Bag or Sac, in which there was about half an *Engliſh* Pint of Water, where all the Water I had drawn off by the *Trocar* had been contained.

The irregular Body which I ſoon diſcovered to be the right *Ovarium*, was near a Foot long, about as much broad, and ſix Inches thick. It was compoſed of a great many ſmall Bags of different Sizes, containing a glairy Matter like Mucilage or Honey. The Coats of the larger ones were thinner than thoſe of the ſmaller; which laſt, in ſome Places, appeared a little cartilaginous, eſpecially thoſe about the middle of this Body, where the *morſus Diaboli* was fixed in Form of an irregular Bunch. The *Tuba Fallopiana* was much lengthened and enlarged in its Diameter.

The *Cyſtis* in which the Water had been contained, appeared to be only the external Cover-

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ing of the *Ovarium*, or elſe one of the *Hydatides* ſtretched out. It adhered ſo firmly to the *Peritoneum* in the Circumference of the *Pelvis*, that, though it was very thick, I had Difficulty to ſeparate them.

When this was removed, the *Uterus* and left *Ovarium* were ſeen in their natural Situation, and of the ordinary Magnitude. In the *Uterus* there was about the Bigneſs of a Hazel-nut of coagulated Blood.

The other *Viſcera* were all ſound, except the *Gall-bladder*, which was not above two Inches long. The Coats of it were conſiderably thick, and cloſely contracted upon two Concretions, each as big as a middle-ſized Nutmeg; between which there was a ſmall Diſtance left, that would ſcarce admit the End of one's Finger, in which a kind of whitiſh-coloured Bile was lodged. On the under Side of the Concretion, next the Inteſtine there was a *Sulcus* that eaſily allowed what Bile was ſeparated to flow into the Inteſtine. Theſe concreted Subſtances are ſtill in my Poſſeſſion.

LXXIV. *Four Caſes of the tumified* Ovarium; *by* ALEXANDER MONRO, *Profeſſor of Anatomy in the Univerſity of* Edinburgh, *and* F. R. S.

SOme Years ago I opened the dead Body of a married Woman, aged thirty ſix Years, who, I was informed, had always been healthy till two Years before her Death; when her *Menſes* ſtopping, ſhe imagined herſelf with Child, and, her Belly having gradually turned bigger, every

every thing was prepared for the Birth. But, after the tenth Month of her ſuppoſed Pregnancy was completed, her Belly entirely ſubſided, upon a conſiderable Diſcharge of Water *per Vaginam*. In ſome little Time after which her *Menſtrua* returned; and having undergone two or three Periods of them, ſhe was for a ſecond Time obſtructed, with the other common Symptoms of Pregnancy. At the End of the ninth Month, when ſhe had the ſame Appearance with other Women in ſuch Condition, ſhe was ſeized with bearing Pains, and continued ſeveral Days in Labour; the Fatigue of which at laſt waſted her Strength ſo much that ſhe died.

The *Abdomen* appeared all over greatly diſtended; and at the under Part I felt through the Teguments a hard ſolid Subſtance, diſtinct from all the other Parts.

The Teguments of the *Abdomen* being cut, I abſorbed with a Spunge out of the Cavity ſixteen Pounds of a dark-brown coloured Water; which was ſo acrid as to give a pricking Pain to my Fingers when ſoaked in it. From the Hollow of the *Ilia* I took out ſome Spoonfuls of a white-coloured *Mucus*.

The internal Surface of the *Peritonæum*, and the external of all the Bowels, were black.

A ſpungy Body of a Lead-colour grew out, and received Veſſels from the *Inteſtinum Ilium*, and Part of the *Meſentery*.

The Spleen was ſofter than ordinary.

The Liver was grown to the *Peritonæum* in all its convex Surface; it appeared of a Lead-colour externally, but was red when cut.

I found in the Gall-bladder ſix Concretions, reſembling

reſembling ſmall Bramble-berries in their black Colour and unequal Surface.

The inferior Part of the *Abdomen*, from a little below the Navel to the *Oſſa pubis*, was filled with a large Body, which was adhering to the *Peritonæum* and Guts contiguous to it. The greateſt Length of this Subſtance was ſtretched tranſverſely from one *Os Ilium* to the other, and was twelve and two fifth Inches; the Breadth of it, from the *Oſſa pubis* upwards, was ſeven Inches, its Thickneſs five and a half.

This Subſtance being removed, I ſaw the *Veſica Urinaria*, *Uterus*, and right *Ovarium*, with its *Tuba Fallopiana*, in a natural State, but could not diſcover the left *Ovarium*; and the left *Tuba* was cut away with the preternatural Body above deſcribed, to which I afterwards found it firmly adhering.

The Blood-veſſels were very large, and obſervable on the Surface of that large Body, which had two ſtrong membranous Coats covering it all round; the exterior of which was eaſily diſſected off, by a cellular Subſtance being interpoſed betwixt it and the internal Membrane, which contained a great many Veſicles of different Bulk diſtended with *Mucus*, or with a firm ſteatomatous Subſtance; and in ſome of the Bags both *Mucus* and *Steatoma* were found.

From which Structure, and the preceeding Account of the Diſeaſe and Diſſection, it is pretty evident, that this preternatural Body was the left *Ovarium* monſtrouſly overgrown and diſtended.

Hiſt. 2. A Woman of twenty one Years of Age, while under the violent Pains of Labour of her firſt Child, was very impatient, and toſſed from

from one Place to another. Soon after, ſhe was ſenſible of a Weight in her right Groin, which, in the different Poſtures of her Body, removed always to the moſt depending Part. However, as it was not attended with Pain, ſhe did not complain of it for ſome Months, till the Weight increaſing, and a Swelling and Hardneſs being plainly felt in that Groin, ſhe aſked Advice of ſome Phyſicians and Surgeons, who applied external Medicines, and gave internal ones, without her being at all relieved.

A Year and an half after her Child-bed, Dr. *Alexander Dundas*, Mr. *James Robertſon* Surgeon and I were conſulted about her. Her Body was at this Time waſted to Skin and Bone, as the common Phraſe is, and ſo weak, ſhe could not turn herſelf from one Side to the other. Her Pulſe was very weak, but quick. She had no Appetite for Food; and ſhe no ſooner took any, than a feveriſh Paroxyſm was brought on, which terminated in a Sweat. The Thirſt was perpetual, and ſcarce to be quenched. She had conſtantly looſe Stools, and paſſed green, violently fetid *Fæces*. She ſleeped none in the Night; and towards the Morning had generally a large Sweat. Her *Menſtrua* had not appeared of a very long Time. The right Side of her Belly was conſiderably ſwelled; and we could feel with our Fingers a hard Tumor below the Teguments, extended over that whole Side; ſo that we could not be ſenſible of its terminating either at the Baſtard Ribs or *Os innominatum*. This Tumor pointed conſiderably outwards about four Inches below the Navel, and as much to a Side of the *Linea alba*; at which Place ſhe had for

ſome time before complained of the greateſt Pain. Here the Teguments felt thin, and a Liquor fluctuated evidently below our Fingers.

The *Prognoſis* we made will eaſily be preſumed not to be very favourable. And, after acquainting the Relations of our Patient's Danger, we propoſed opening that prominent Part of the Tumor, as the only Remedy that had the leaſt Chance of relieving her, though the Conſequences even of that Operation were very uncertain. Having obtained the Conſent of all concerned, Mr. *Robertſon* made an Inciſion of an Inch long into the Part where the greateſt Appearance of *Pus* was; but we were all not a little ſurpriſed to obſerve nothing but a great Blaſt of Wind to follow the Lancet, and the Belly to ſubſide conſiderably in an Inſtant. The Patient complained leſs of Pain that Night. Next Day a large Quantity of green fetid *Fæces*, ſuch as ſhe had purged of a long Time, was evacuated at dreſſing the Wound; and the two following Days the ſame kind of Matter was diſcharged, but the Quantity of it diminiſhed daily; and, in the mean time, her *Diarrhæa* decreaſed in Proportion, and ſhe ſlept tolerably well all Night.

The fifth Day after the Inciſion, neither Wind nor *Fæces* came by the Wound, but it diſcharged about four Ounces of good *Pus*.

From this Time we entertained Hopes of her Recovery: For the *Diarrhæa* was quite ſtopped; her Appetite became better, her Strength increaſed, the hectic Fever and Sweatings gradually diminiſhed, and ſhe ſlept well. An analeptick Diet of Jellies, Broaths, Aſſes Milk, *&c.* was preſcribed her; and cooling Emulſions, with gentle

gentle Opiates at Bed-time, were given. The Ulcer yielded a moderate Quantity of well-digested *Pus*, and the hard Tumor of the *Abdomen* diminished considerably; so that in two Weeks we could press the Points of our Fingers betwixt the Ribs and its superior Extremity, and betwixt the *Os innominatum* and the lower Circumference of this hard Swelling.

After a Month's Dressing we discovered a *Sinus* going out from the old Orifice, and extended under the Teguments about four Inches down, and outwards, which Mr. *Robertson* cut open; by which the Surface of the Tumor being laid bare, we endeavoured to encourage the Suppuration as much as possible, by gentle Escaroticks mixed with digesting Balsams applied to the Ulcer, and emollient suppurating Poultices laid over the whole Hardness. The Discharge obtained by these, daily wasted the Tumor; and, in three Months, she seemed to be in perfect good Health; and refused to allow the Ulcer to be kept any longer open, though there was still a Hardness and Swelling to be felt some Inches round the Orifice; so that we were obliged to cicatrize the Ulcer.

She continued about two Years free of all Complaints, when a new Suppuration came on. But she was so afraid of being put to Pain by making new Openings, that she would allow none of us to be informed of her Indisposition, but managed it herself, with the Advice and Assistance of some good Women whom she confided in. One of whom told me after her Death; that, frequent Suppurations coming on, and the small Orifice made by the *Pus* soon closing, her former bad

Symptoms gradually appeared; and having ſtruggled in a miſerable Way about three Years from the firſt Beginning of her Relapſe, ſhe at laſt ſunk under the Diſeaſe, and died.

The Account the Patient gave of the firſt Riſe and Symptoms of her Diſeaſe, ſeems to lead one to judge the *Ovarium* to have been affected; and the *Ovarium* being ſuppoſed monſtruouſly ſwelled, adhering to the *Colon*, at laſt inflamed and ſuppurated, with the *Pus* eroding a Hole through the Coats of the *Ovarium*, and the contiguous adhering *Colon*, will readily account for all the *Phænomena* in this Caſe, which at firſt View ſeem attended with ſo many Difficulties.

Hiſt. 3.———aged twenty ſix Years, of a delicate weak Conſtitution, in bearing her fifth Child, was put to moſt violent Pain, by her Midwife pulling away the *Placenta* indiſcreetly; which Pain, however, after ſome Hours, abated conſiderably, and continued moderate till the ſecond Day after, when ſhe complained of a moſt racking deep-ſeated Pain of her left Groin. There was no Hardneſs, Swelling or diſcolouring to be obſerved. When ſhe attempted to lie on the left Side, the Pain was greatly increaſed. Her Pulſe was quick, but weak. Her Thirſt was exceſſive, her Belly coſtive, and the Quantity of Urine ſmall. The *Lochia* were in ſufficient Quantity. She was leaner and weaker than ordinary, and often complained of being faint.

Emollient eccoprotic Clyſters were injected. She had Almond-milk given for Drink, and farinaceous Slabbs for Food. When faint, ſhe took a Spoonful of a cordial Mixture. The pained Part was frequently fomented with Emollients.

The

The Symptoms ſtill increaſing, I obſerved on the eighth Day a large Tumor below the Muſcles, extended from the *Os Pubis* to the ſuperior Part of the left *Os Ilium*, and the Skin above it of a red Colour. Her Strength by this Time was ſo much ſpent, ſhe could ſcarce turn herſelf in her Bed. Lying on either Side tortured her ſo much, that ſhe was obliged to lie conſtantly on her Back. She breathed with great Difficulty, and frequently fainted. Since therefore no Hopes of reſolving the Tumor appeared, I applied a ſuppurative Cataplaſm all over it, continued her Cordial, and every Evening gave a ſmall Doſe of *Opium*.

She continued in this miſerable and extremely weak Condition for ſome more than two Weeks; and at laſt was attacked with a Vomiting and *Diarrhœa*, which continued two Days, till the purulent Matter of the Tumor, eroding the Teguments about two Inches above the Ring of the external oblique abdominal Muſcle, was diſcharged in a conſiderable Quantity: After which the Vomiting and *Diarrhœa* ſtopped, the Fever diminiſhed, the Pain abated, and ſhe began to ſleep calmly.

The Orifice of the Ulcer being ſmall, I propoſed to enlarge it by cutting; which ſhe abſolutely refuſed to ſuffer, as ſhe had done alſo my opening the Tumor, when I firſt was ſenſible of Matter fluctuating in it. A Tent charged with *Baſilicon* and *Red Precipitate* was introduced, and the former Cataplaſm continued. Some Days thereafter, two other ſmall Holes were made by the acrid *Pus*, at a little Diſtance from the former, which gradually were enlarged by

the conſtant Uſe of the *eſcharotick* Powder. The Liquor diſcharged by theſe Orifices was ſometimes purulent, but much oftner was glairy *Mucus*, reſembling the White of an Egg.

The Orifices being kept open, and the Suppuration encouraged, by continuing the Method of Dreſſing mentioned, the Hardneſs gradually melted down, the bad Symptoms went off, and ſhe recovered Strength; but for ſeveral Months was often attacked by violent aſthmatick Fits, from which the *Oxymel pectorale* of the *Edinburgh* Diſpenſatory never miſſed to relieve her. Since this Time ſhe has enjoyed as good Health as ever, and has born ſeveral Children.

The Manner of this Tumor's Increaſe, its being confined to one Side, without any ſtopping of the *Lochia*, when the Inflammation was violent, and without any Diſcharge of *Pus per vaginam* when the Tumor ſuppurated, and the Liquor evacuated by the Orifices of the Teguments being moſtly *Mucus*; all conſpire to point out the *Ovarium*, and not the *Uterus*, to have been affected.

Hiſt. 4. In a Letter from Mr. *Hugh Sutherland* Surgeon, now Phyſician at *Kirkwall* in *Orkney*, I was deſired to give Advice in the Caſe of a Gentlewoman, who, ſix Weeks after being delivered of Child, complained of a Pain and Hardneſs at the lower Part of the right Side of the Belly; which, afterwards ſpreading upwards, and to the left Side above the *Os Pubis*, gave her great Trouble. Her *Menſtrua* had not appeared for ſome Months after Child-bed; her Urine was in ſmall Quantity. She was conſtantly he-

ctic,

ctic, had no Appetite for Food, and was reduced to great Weakneſs, and to Skin and Bone.

Mr. *Sutherland* informed me, that an hyſteric Plaiſter, beſmeared with *Ol. Succin.* had been applied to the Tumor, and that it was afterwards embrocated with a Liniment compoſed of *Ung. Alth. Sp. Sal. Ammon. Ol. Succin. & Anis.* She had taken the ſtomachic Bitters ſome time, and uſed *Sal Prunel.* diſſolved in her ordinary Drink. By theſe Medicines her *Menſtrua* were brought to be regular, the Urine came to be in good enough Quantity, and the hectic Fever ſeemed to be gone: But her Appetite ſtill continued bad, and after eating ſhe was ſick and uneaſy. Her Belly was ſo coſtive, ſhe ſcarce had a Stool once a-week. She ſtill was weak and lean. The Pain, Hardneſs, and Tenſion of her Belly increaſed evidently. Though ſhe ſlept much, both in the Night and Day, yet ſhe neither was ſtrengthened nor refreſhed, but always awaked weary and fatigued.

In anſwer to this Account, I wrote Mr. *Sutherland*, that I ſuſpected the right *Ovarium* to be tumefied; and in caſe my Suſpicion was juſt, probably he would, upon Inquiry, find that the Progreſs of the Tumor had been much in this Manner. Before any Swelling and Hardneſs diſcovered themſelves, our Patient was ſenſible of a Weight, which changed its Seat to different depending Parts of the *Pelvis*, according to the different Poſtures of her Body. The Increaſe of the Tumor was from below upwards; and when once it became ſo large as evidently to make the Teguments of the Belly prominent, the Tumor was fixed, and would

ſhift

ſhift Place no more. If there was no Suppuration yet begun, the Pain would be but obtuſe, without any external Redneſs or Hardneſs in the Teguments, and without Fever, Thirſt, *&c.* If a Suppuration was begun, all theſe Symptoms which I juſt now ſuppoſed her free of, would be appearing.

On the Suppoſition of no Suppuration, I was of opinion the Tumor ſhould, if poſſible, be reſolved; and therefore propoſed to foment the ſwelled Part frequently with an aperient reſolvent *Fotus*, and to keep a Cataplaſm made with the emollient Farines, a conſiderable Proportion of *Galbanum* diſſolved in the Yolk of an Egg, ſome *Ung. Alth.* and the Liquor for Fomentation, conſtantly applied to the Part. In the mean time ſhe ſhould continue the Uſe of the ſtomachic Bitters, with Pills compounded of the ſtinking Gums, and a ſmall Proportion of Aloes, and ſhould be ordered the lighteſt, eaſieſt digeſted, and leaſt heating Food; ſhould drink Whey, Barley Ptiſan, or Wine and Water.

If the Symptoms of Suppuration were come on, it ought to be forwarded as much as Art could.

Some Months after I had ſent this Letter, an Anſwer was delivered to me from Mr. *Sutherland*, by my Patient's Huſband, acquainting me, that the Progreſs of the Tumor had been preciſely in the Manner I had deſcribed, but without any of the Symptoms of Suppuration. That this lucky gueſſing at Symptoms I had not been informed of, and of which they had not taken the leaſt Notice before my Letter, had given our Patient great Courage, and had made her

her punctually obſerve the Directions I had mentioned; by means of which the Tumor and Pain were altogether removed, without any obſervable Evacuation of Matter any way, and my Patient was healthy and ſtrong.

Since her Recovery ſhe has born Children, and continues in a good State of Health; only that ſhe is ſenſible of what ſhe calls a Weakneſs in that Side, and after travelling and riding ſhe feels Pain where the Tumor was formerly.

LXXV. *Ulcers from* Dracunculi; *by Meſſrs.* Robert Hutcheson *and* George Forbes, *Practiſers of Phyſick and Surgery in the Iſland of* Bermuda.

THE Hiſtories of the *Dracunculi*, *Indian* or *Guinea Worms*, which we have ſeen, not being related ſo accurately as we think can aſſiſt young Practiſers to manage Patients under that Diſeaſe, we ſend you the following Caſe, hoping it may be of Service to others who may practiſe in this Part of the World.

A Boy lately brought from *Guinea*, about fifteen Years of Age, of a thin Habit of Body, complained, while on a Voyage from *Jamaica* to this Place, of ſharp Pain on the Outſide of the *Tibia*, where there was Hardneſs and Swelling, and Appearance of Suppuration. We took eight Ounces of Blood, and purged him with *Manna* and *Cremor Tartari*, rubbed the Part with *Ung. Alth.* and gently rolled it up. The Boy complained much of Pain all that Day, and was reſtleſs, drowthy and feveriſh all

all Night. Next Morning the Tumor, Tenſion, and Inflammation of the Leg, were increaſed. We embrocated it again with the Ointment, and applied a Cataplaſm made of the *Farin. Sem. Lim. Fœnugræc.* and *Ung. Alth.* After dreſſing it thus two Days, the Suppuration was compleat, and an Inciſion two Inches long was made into the Teguments of the Abſceſs, from which two Spoonfuls of *Pus* and Blood were diſcharged. The Sore was dreſſed with *common Digeſtive*, with a Pledgit of *Ung. Baſilic. flav.* and *Diachyl. cum Gumm.* Plaiſter over it. That Night the Boy was much more eaſy, and ſlept. Next Day the Sore ſeemed to be digeſting very well; but we obſerved a Subſtance about the Size of a common Silver Probe, of a pure white Colour, like a Tendon, hanging out from the ſuperior Part of the Aperture. Upon gently drawing this Subſtance we extended it to three or four Inches in Length, and then, judging what the Diſeaſe was, rolled it upon a ſmall Pipe of Lead, and ſecured it with a Thread. Next Day we made a Purchaſe of eight Inches, and put in a Piece of Sponge-tent to prevent the Contraction of the Lips of the Sore. At the third Dreſſing, the Boy complained of his Toes, and his *Metatarſus* was ſwelled. This Tumor was treated in the ſame Manner as the former, but did not ſuppurate ſo kindly; for, upon opening it, a black Ichor mixed with Blood only was diſcharged, and the Leg became oedematous. We met at the ſame time with rough cold Weather, which affected the Boy much, and the Leg ſeemed to threaten a Mortification. We fomented it well, put a Cloth wet

wet in Spirit of Wine over it, and rolled it from the Toe to the Ham. We repeated the Fomentations in the Evening, and obſerving ſome watery Bliſters round the Orifice in the Foot, with a livid Colour of its Lips, we ſcarified it all round, dreſſed it with warm *Ol. Terebinth.* put the Cloth with Spirits and the Bandage over it, and gave the Boy a Cordial.

Next Morning the Sore looked freſher, the Scarifications began to digeſt, and we diſcovered the Extremity of another *Dracunculus*, but ſo firmly fixed, that we durſt not venture to draw any of it out, but were contented to tie a Thread round it. We put the Boy on a ſtrict Regimen of Diet, allowing him no ſalt Meat or Spirits, gave him Laxatives ſometimes, and continued our former Dreſſings. The Digeſtion of the Wounds going well on, the Purchaſe of the Worms became eaſier: Of the one in the Leg we had three Yards and a half; but, after bringing out ſix Inches of the one in the Foot, we broke it by extending it too quickly; it retreated and diſappeared. Fluxion, Swelling, Inflammation, and violent Pain, immediately came on; and next Dreſſing there were Tumefactions at the End of the *Fibula*, on the firſt Joint of the great Toe, and two on the muſcular Part of the Leg. We treated them all in the ſame Way the firſt had been managed, and in eight Weeks we extracted from the different Ulcers thirty Yards of the *Dracunculus*; after which the Ulcers healed, and cicatrized with no Trouble. We thought it however proper to give our Patient a Courſe of *Æthiops Mineral*, with gentle Purga-

Purgatives now and then; by which Management he became a ſtrong jolly young Lad.

LXXVI. *A Deſcription of the* African *Diſtemper, called the* Yaws, *with the true Method of Cure; by*——— †.

THE *Yaws* is a Diſtemper *epidemical*, or rather *endemical*, to *Guinea* and the hotter Climates in *Africa*, ſeldom failing to attack each Individual of both Sexes one time or other in their Lives, but moſt commonly in Childhood or Youth. It makes its firſt Appearance in little Spots on the Cuticle, level or ſmooth with the Skin, at firſt no larger than the Point of a Pin, which increaſe daily, and become protuberant like Pimples. Soon after, the Cuticle frets off; and then, inſtead of finding *Pus* or *Ichor* in this ſmall Tumor, you only find white Sloughs or *Sordes*, under which is a ſmall red *Fungus* growing out of the *Cutis*, increaſing gradually to very different Magnitudes, ſome leſs than the ſmalleſt Wood-ſtrawberry, ſome as big as a Raſpberry, and others even exceeding in Bigneſs the largeſt Mulberries; which Berries they very much reſemble, being knobbed as they are. While they are coming to this Height, the black Hair that grows out of the Parts now covered with the *Yaws* changes gradually white; I do not mean, appears white by the *Ichor* of the *Yaws* drying upon it, as all the Skin does towards

† The Gentleman by whom this Paper was communicated, not having obtained the Author's Conſent to put his Name to it, would not allow us to inſert it.

towards the End of this Diſtemper; but the Subſtance of the Hair itſelf is changed from black to a tranſparent white, like the white Hairs of old Men.

I think it impoſſible to calculate the exact Time that the Diſtemper requires to go through theſe different *Stadia*. Some Conſtitutions may be more adapted to produce this nauſeous Diſtemper, or to receive it from others by Infection; nay, the ſame Conſtitution may be apt to receive or produce it at one Time more than at another: And, if it is produced by external Infection, the Degree and Quantity of Infection may haſten or retard the Symptoms. This I know by Experience, that Negroes who were luſty, in good Plight, and had full Nouriſhment allowed them, in a Month after diſcovering the white Spots, have had ſeveral *Yaws* as big as a Mulberry; and in Negroes that were low in Fleſh, and have had but a poor ſcanty Diet, in three Months Time none of the *Yaws* have exceeded a common Strawberry in Size.

The *Yaws* appear indeterminately on all the Parts of the Body; but the moſt and biggeſt are generally on the Groins, about the Privities and *Anus*, in the Arm-pits and Face. When the *Yaws* are very large, they are few in Number; and when many in Number, they are ſmall in Size. All this Time the Patient is in good Health, does not loſe his Appetite, and ſeems to have no other Uneaſineſs but what the Naſtineſs of the Sores occaſion; for they are not painful, except they are touched too roughly. This is the natural Appearance of the Diſtemper, when left to itſelf; and in this State

it will continue a long time, without any ſenſible Alteration: And what might be the Conſequence in Time, I cannot pretend to tell you; whether it might not conſume itſelf, and cure as ſoon as the peccant Matter is thrown entirely out and exhauſted? Or, whether theſe *Funguſes* might not turn corroſive Ulcers, and at the ſame time affect the Bones with *Nodes*, *Exoſtoſes* and *Caries*, as it does when the Cure is attempted without Succeſs? Or, whether it might not alter the Diameter of all or ſome of the Excretory Ducts of the miliary Glands, and adapt them to excrete a Fluid more viſcid than the natural Sweat, or inſenſible Tranſpiration, which, drying on the Skin, would render the Patient ſcorbutick or ſcabby, that is, leprous? This I imagine to be the moſt probable Conjecture, and that, as ſoon as the Funguſes are dry, the Infection is exhauſted. This Diſtemper being infectious, it is the Buſineſs of the Negroe's Maſter to ſeek for a Cure, as well for the Sake of the Negroe affected, as for himſelf, Family, and other Negroes on the Eſtate, that have not had it before, who are in danger of being infected.

The *Yaws* do not prove often dangerous, if the Cure is undertaken ſkilfully at a proper Time, and the Patient has not undergone any Courſe of Phyſick for them before; but if the Patient has been once ſalivated, or taken any Quantity of *Mercury*, and the Skin once cleared, and they appear again, they are always very difficult to cure, and often incurable. And indeed I am of opinion, that the following Train of terrible Symptoms owe their Original as much to the untimely and unſkilful Uſe of

the

the *Mercury*, as to the Distemper itself. I am induced to this Belief by these Reasons.

All the Negroes that have had the *Yaws* in *Africa*, and have been cured there, never have them again here, or any bad Symptom that seems to proceed from them. And in the Course of nine Years Practice here, I never had any Patient that relapsed when I was first employed, nor ever lost one, though I have cured Numbers of both Sexes, and of all Ages. Nor is it to be admired, that the *Africans* should understand their Country Distemper better than we *Europeans*; they probably have had above three thousand Years to gain Experience of it by Observation; we have not had one hundred Years.

As soon as a Negroe is perceived to have the *Yaws* coming out upon him, he must be removed to a House by himself; or, if you cannot be sure whether it is the *Yaws* or not, shut him up seven Days, and look upon him again, as the *Jews* are commanded to do with their Lepers, *Lev.* chap. xiii. and in that Time you may commonly be certain. As soon as you are convinced that the Eruptions are really the *Yaws*;

℞ *Flor. Sulphur.* Scrup. i.
Camphor. (in Spt. Vin. sol.) Gr. v.
Theriac Andromach. Drach. i.
Syrup. Croci, q. s. m. ft. bolus.
Quaque nocte horâ somni sumendus.

Repeat this Bolus every Night for two or three Weeks, or till the *Yaws* are at their Height; which is easily discovered by their being at a stand, neither increasing in Size or Number: Then is the Time to throw your Patient into a gentle Salivation by *Calomel*, without any fur-

ther Preparation of the Body. Give the *Calomel* in ſmall Doſes at a Time, that it may neither vomit nor purge. I never exceeded five Grains at a Time in Pill or Bolus, and repeated the Doſe once, twice, or thrice a-day, as I found the Patient could bear it, and never deſignedly raiſed the Salivation to above a Quart ſpitting in twenty four Hours. Very often by the Time you have got the Salivation to this Height, all the *Yaws* will be covered over with a dry ſcaly Cruſt or Scab; which, in Patients that have been full of them, makes a very terrible Figure. Theſe Cruſts or Scabs fall off daily in ſmall white Scales, and in ten or twelve Days leave the Skin ſmooth and clean. Then I leave off giving any more *Calomel*, and let the Salivation go off gradually of itſelf. After the Salivation, ſweat them twice or thrice in a Frame or Chair with Spirit of Wine, and preſcribe the following Electuary:

℞ *Æthiop. Mineral.* Unc. i. *ſem.*
Gum Guajac. Unc. *ſem.*
Ther. Andromach.
Conſer. Roſar. rubr. aa. Unc. i.
Ol. Saſſafraſ. Gutt. xx.
Syrup. Croci, q. s. m. Electuar.
Capiat Dr. ii. *mane & veſperi.*

I likewiſe order them to drink the Decoction of *Guajacum* and *Saſſafras*, fermented with Syrup or Molaſſes, for their conſtant Drink, while they take the Electuary, and to be continued for a Week or a Fortnight after the Electuary is done.

Sometimes, after all the other *Yaws* are fallen off, the reſt of the Skin is clear, and the Salivation is over, there remains one large *Yaw*, high

high knobbed, red and moiſt. This is commonly called the *Maſter-yaw*, and has coſt many a Negroe his Life, by the Practitioner's believing that this required another and another Salivation. In Reality this requires no more than being deſtroyed by a gentle Cauſtick, or mild Eſcharotick, about an eighth or tenth Part of an Inch lower than the Skin, and then it will cure up as eaſy, and as ſoon as any other Ulcer of the ſame Bigneſs and Figure. I commonly have uſed *Præcip. rubr. Allum. uſt. aa. p. æ.* for my Eſcharotick, digeſted with *Ung. Baſilic. flav.* Unc. i. *Præcip. rubr.* Dr. i. and cicatrized with Lint preſſed out of Spirit of Wine, and with the Vitriol Stone.

After the *Yaws* are cured, ſome Patients are afflicted with Carbuncles in their Feet, which ſometimes render them uncapable of walking, or, if they do walk, it is with much Pain.

This Diſtemper ſeems to be owing entirely to the *Yawy* Matter being confined by the Hardneſs of the Cuticle in the Soles of their Feet, by continually walking barefooted. Sometimes the whole Sole of the Foot will be affected, and they cannot bear any touching it; and at other Times there is only one Spot no bigger than an *Engliſh* Shilling. In Time the Pain brings on an Inflammation and Suppuration, and the Patient is eaſy. It ſeems to be cured, and often is ſo, by the whole *Yawy Fungus* being conſumed by the Suppuration. At other Times, in five or ſix Weeks, as the Skin hardens, the Pain, Inflammation, *&c.* begin again, and thus the Symptoms go and return for Years, till either the *Fungus* is conſumed by the frequent Suppurations,

or deſtroyed by Art. Many *Noſtrums* the Planters and Negroes try for this Malady, but the only effectual Method is by bathing and paring, to deſtroy the Cuticle, and then proceed as in the *Maſter-yaw*. The gentle Eſcharoticks are to be preferred, eſpecially here, and all imaginable Care is to be taken to avoid the Tendons and *Perioſteum*.

In Children under ſix or ſeven Years old, who cannot be ſuppoſed to have Senſe enough to go through a Salivation, at the proper Time of ſalivating, I begin to give them a Grain or two of *Calomel* in white-Sugar once a-day, once in two Days, or once in three Days, ſo as only to keep their Mouths a little ſore till the *Yaws* dry, and falling off in white Scales, leave the Skin clean. This ſucceeds always, but requires a longer Time than in Adults.

I have thrice had the Mother with her ſucking Child under my Care for the *Yaws*; both Mother and Child were full of them. Two of the Children I cured by curing their Mothers, without giving the Children any Medicine but what they received from their Mothers in ſucking their Milk. The third Child, who was both bigger and older than the former two, when his Mother was well, his *Yaws* were dry, and in one white Cruſt or Scab, but did not ſcale off; and I was obliged to finiſh his Cure with three or four ſmall Doſes of *Calomel*, and a Courſe of *Æthiops*. I have been well informed, that even in Adults the *Æthiops Mineral*, given in large Doſes for three or four Months, will make a perfect Cure. I never tried it, becauſe it requires ſo long a Time, and there is no truſting a Negroe

to

to take his Medicines himſelf; and the Planters neither care to loſe their Labour, nor to take the Trouble of attending them ſo long: But I am convinced it would ſucceed with Safety.

Some may be ſurpriſed, that, in my *Mercurial* Courſe for this Diſtemper, I neither prepare the Body with blooding and purging before the Salivation, nor purge after it. As to the firſt, the Diſtemper is cutaneous, or rather the Skin is the natural Emunctory by which the peccant Humour is thrown off in this Diſeaſe, by a very extraordinary and preternatural Criſis. All that I mean by a preternatural Criſis is, that the Cauſe of this Diſtemper, like the Small Pox, can never be concocted, ſo as to go off by any of the natural Secretions. And the Funguſes here are as natural as the Puſtules in the Small Pox: For if you ſalivate your Patient before the *Yaws* are at their Height, the beſt that you can expect is their appearing again ſoon after the Salivation. And what can be expected from bleeding and purging, but retarding the *Yaws* in coming out to their Height, and probably carrying off ſome Fluids that are abſolutely neceſſary to Nature in her Operation, or perhaps intimately mixing the Cauſe of this Diſtemper with the Fluids, ſo that an entire Separation can never be procured afterwards?

And as to purging after Salivation, if the morbifick Matter is entirely exhauſted, what Occaſion is there for Purges? Can we propoſe carrying the Matter off by the Inteſtines, which naturally ſeems to go off by the *Yaws* themſelves? Is it not more probable, that ſome ſmall Particles that are left about the Skin, might

might be waſhed off by the natural Perſpiration and Heat, which, by purging, may again be returned to the Blood, and create freſh Diſorders? Add to all this, the *Maſter-yaw*, when in full Bloom, is merely topical, and eaſily cured by Topicks, though it contains Infection enough to produce the *Yaws* in hundreds by Inoculation.

The venereal Diſeaſe and the *Yaws*, as far as I have deſcribed the latter, are very diſtinct Diſtempers; but the Symptoms, in conſequence of the *Yaws* ill-cured, coincide ſo exactly with the Symptoms of an inveterate *French Pox*, and too promiſcuous Copulation of the Negroes renders them ſo liable to the venereal Taint, that in moſt Caſes it will be very difficult, if not impoſſible, to diſtinguiſh them, eſpecially if the Patient has had both Diſtempers at any Time in his Life before his preſent Complaints.

The Symptoms are, violent Pains in the Limbs, even nocturnal, which with ſome are attended with *Nodes* and *Exoſtoſes*, in others with Ulcers, which render the Bones carious. I ſhall not pretend to determine which Diſtemper they belong to; but I think, if a Patient that never had any Symptoms of the venereal Diſeaſe, and had the *Yaws*, was to labour under theſe Symptoms, I ſhould make no doubt of their proceeding from the *Yaws*; and more ſo, if theſe Symptoms did not yield to the Method of Cure that either palliates or cures the *Pox*, but rather irritates and increaſes them. I ſhall give an Obſervation or two, where I think the Caſe proceeded from the *Yaws*, and leave you to judge for yourſelf.

In

In the Year 1727, I was deſired to look upon a young Negroe Man, long afflicted with Ulcers in his right Leg and Foot, occaſioned, as was ſuppoſed, by the *Yaws* being ill cured in his Childhood. He ſeemed to be healthy in every other reſpect, and had undergone ſeveral Salivations and Courſes of Phyſick unſucceſsfully. I found two of the *metatarſal* Bones conſumed, and the other three carious; the *Os calcis* and the lower *Epiphyſis* of the *Tibia* were likewiſe carious. I told the Lady to whom he belonged, that it was not in my Power to ſerve him; theſe Bones would rot, and not exfoliate; and if I proceeded to Amputation, as they deſired, I either ſhould not be able to cure up the Stump, or if I did, he would not long ſurvive it. However, upon the continual Intreaties both of the Miſtreſs and Negroe, I at laſt condeſcended to amputate his Leg.

I bled and purged him twice or thrice, and made him an Iſſue in the oppoſite Leg, and one in each Arm. Some Days after they were digeſted, I took off his Leg at the uſual Place, and cured the Stump with all the Eaſe imaginable; and he was very glad to walk about on his wooden Leg. About a Month after the Stump was perfectly cicatrized, he was ſeized with a Fever, and, in a few Days after, with a violent Pain and Inflammation in his Thigh and Knee of the amputated Leg. In a Fortnight after the Approach of the Fever, I found a Fluctuation of Matter in his Ham; and opening it by Inciſion, diſcharged a Pint of Matter at firſt. As the Impoſthume digeſted, the Fever wore off, and he recovered. He is now alive.

live and in Health; but keeps the Inciſion ſtill open as an Iſſue.

A young Woman of a good Education came from *England* here, as a School-miſtreſs to a Gentleman's Daughter. Some time after, ſhe married an Overſeer, who gave her the *Yaws*. As ſoon as ſhe perceived the Diſtemper, being much frightened, ſhe went to a Planter, who uſed to cure a great many Negroes. There was then but juſt *Yaws* enough to ſhow that Diſtemper. He immediately ſhut her up in the Hot-houſe, (as they call it here), and that Night anointed her with the mercurial Unction, according to *Serjeant Wiſeman*'s Proportion of the *Quick-ſilver*. This once anointing threw her into a deep Salivation, which laſted between ſix and ſeven Weeks. Four Weeks of that Time ſhe could not ſpeak a Word, and the *Saliva* was deeply tinged with Blood. After the Salivation ſhe ſeemed perfectly well, ſoon recovered her Strength, and engaged to go to *England* with a Gentleman's Lady as her Chamber maid; and accordingly imbarked in *May* or *June* 1728.

Some Weeks after ſhe arrived at *London*, ſhe was attacked with violent Pains in her Arms and Legs, and applied herſelf to a Surgeon or Apothecary of her Acquaintance, who gave her many Medicines to no Purpoſe; for while ſhe was under his Care, an Ulcer broke out in her Leg, and another in her Arm. Upon this, her Money beginning to fall ſhort, and thinking ſhe had a better Chance of getting well in a Country where her Diſtemper was known, than where they knew little of it, (at leaſt thoſe ſhe applied

applied to), ſhe got a Paſſage to this Iſland again.

In *Auguſt* 1729, ſhe came to me begging my Aſſiſtance. She was really an Object of Charity, and I promiſed to give her my utmoſt Endeavours to ſerve her, without the leaſt Proſpect of Gain. The Pains of her Limbs then continued ſevere, and ſhe had five or ſix Ulcers in different Parts of her Arms and Legs, all covered with an *Hyperſarcoſis*.

I told her ſhe muſt be very ſincere in anſwering what Queſtions I aſked her; for as her Huſband had given her the *Yaws*, he might as well have given her the *venereal Diſeaſe*; and that I ſhould have more Hope of curing her, if the preſent Symptoms proceeded from the laſt, than if they were the Conſequence of the firſt. She told me ſhe never had any venereal Symptom in her Life, either before ſhe had the *Yaws* or ſince: That a few Days before ſhe diſcovered ſhe had the *Yaws*, her Huſband left her, and went to Sea, his firſt Profeſſion: That ſhe had never ſeen him ſince, nor converſed criminally with any other Man. Her ſincere and ſenſible Way of anſwering every Queſtion I could aſk her, as they occurred to me, and the good Character ſhe bore among her Acquaintances, as well as its being her Intereſt to tell me the Truth, which ſhe might without any Shame, convinced me ſhe was ſincere, and had no Deſign to deceive me, or ruin herſelf.

I immediately dreſſed the Ulcers with gentle Eſcharoticks, to deſtroy the *Hyperſarcoſis*, and put her into a Courſe of *Æthiops*, with the Decoction of the Woods in Lime-water, and gave her

her gentle Catharticks twice a Week with *Mercurius dulcis.* After a Month or ſix Weeks ſpent in this Method, I found it had no Effect; for, after the *Funguſes* were conſumed, the Ulcers ſeemed to digeſt a few Days, and then gleeted again, and never in the leaſt contracted. I then threw her into a gentle Salivation with *Calomel*, deſigning to keep her long in it gently. After ſhe had ſpit about a Quart a Day for four Weeks, finding it not anſwer, the Ulcers enlarging, and the Pains becoming more violent, I was reſolved to let it go off. But at Night there fell a great Rain, and the Room not being tight in the Roof, was very wet. The next Day the Salivation ſtopt, and ſhe had a Fever for a Fortnight, which at length went off, and left her ſo weak and emaciated, that I was afraid ſhe would die conſumptive at laſt.

I then put her into the Milk Diet, and ordered her a Decoction of *Sarſaparilla* and *China* Roots, to be drank for her conſtant Drink, with one third Milk. In about eight or ten Weeks ſhe recovered her Strength and Fleſh, and was adviſed by ſome of her Neighbours to uſe a Diet-drink that a certain Negroe made, which they ſaid had cured Numbers in her Caſe, after all other Means had failed. This ſhe uſed ſix or ſeven Months, and dreſſed the Ulcers with *Tincture of Myrrh*, bathing them every Dreſſing with warm Lime-water. But both they and her Pains increaſed. The Bones became carious in every Ulcer, and ſhe lingered under the Diſtemper to the End of the Year 1734, and died.

When I came to this Iſland, it was the Practice

ctice here, as ſoon as the *Yaws* appeared, to give the Patient twenty five Gutts of a Solution of two Drams of *Mercur. ſublimat. corroſiv.* in eight Ounces of ſtrong Rum in the Morning, drinking warm Water after every Puke, and they would vomit and ſpit all the Forenoon. This Doſe they repeated every Morning, increaſing the Quantity five Gutts every Doſe they took, in a few Days they were ſeemingly well. But I obſerved that moſt that had been treated after this Manner, either broke out again, or in Proceſs of Time complained of gnawing Pains in their Bones, or were ſubject to Ulcers in ſeveral Parts of their Bodies. The Diſeaſe at its ſecond Appearance was long of coming to an Height, and required a longer Courſe of Mercury to clear their Skin; and ſometimes, after all, they would relapſe a third and fourth Time.

Of theſe Patients that were affected with Ulcers, I have ſucceeded with ſome by Salivation, and long Courſes of the *Æthiops*, with the Decoction of the Woods in Lime-water; many I have been foiled in, and never been able to cure, but left them, I think, rather worſe than I found them, to linger out their Days miſerably. Nor can I pretend to better Succeſs in thoſe that have complained of Pains in their Bones. They have generally ended in *Nodes*, *Exoſtoſes*, and *Caries*, and the Bones of the Arms and Legs break without any external Violence.

A Negro Man called *America*, belonging to Sir *William Stappleton*, after having had the *Yaws*, complained of Pains in his Limbs, and had been uſeleſs in the Plantation for nigh twen-

ty Years, moſt of his Bones being full of *Nodes* or *Exoſtoſes* and *Caries*. In the Year 1733, his *Os humeri* broke in the middle, without any external Accident. I reduced and dreſſed it as a common Fracture. About ſix Weeks after, when the *Callus* ought to have been grown ſtrong, I found the Ends of the Bones move eaſily one on another; and, upon a gentle Extenſion of his Arm, the Ends of the Bones were a full Inch diſtant from each other. In about twelve Months more, the *Os humeri* was conſumed entirely within an Inch of the *Scapula*, and about the ſame Diſtance from the Elbow. Soon after this he died tabid.

It is worth while to compare the Deſcription of the *Leproſy* among the *Jews* in Chap. xiii. of *Leviticus*, with the Account which I have here given of the *Yaws*: The two Diſtempers ſeem to have a great Reſemblance to each other.

LXXVII. *An Eſſay on the Cauſe of animal Heat, and on ſome of the Effects of Heat and Cold on our Bodies*; *by* JOHN STEVENSON, M. D. *Fellow of the College of Phyſicians at* Edinburgh.

THO' I imagine, that, in the following Pages, there are ſome Pieces of *Theory* new, or ſet in a clearer Light than they have hitherto appeared in; yet, if I had not been fully perſuaded that the *Practice of Medicine* (about which only I am anxious) was to receive ſome Improvement from them, I ſhould never have been prevailed upon to put into your Hands a Per-

Performance ſo incompleat and diſorderly. But, conſidering that this is your laſt Volume, and that I ſhall probably never make thoſe Experiments I once intended to have made, and finiſh the other Parts I had projected. I give you theſe Papers, looſe as they are, to be purſued and perfected, if they deſerve it, by thoſe who have more Leiſure and Genius for ſuch Inquiries.

A Part of the Thoughts on *Animal Heat* were read in our Philoſophical Society; as were likewiſe thoſe on the *warm Pediluvium*. The intermediate and ſucceeding Articles relating to theſe Subjects, are Sketches of a Deſign to complete *the natural Hiſtory of the human Body with reſpect to its Heat, and ſome of the Effects of Heat and Cold upon it.*

Tho' the Connexion of ſome looſer Thoughts with theſe Subjects may not appear great, you will, at leaſt, ſee how I was led into them. If they ſeem neither entertaining nor uſeful, you are at full Liberty to retrench them, or any other Parts, or indeed to ſuppreſs the whole.

Even in Theories merely ſpeculative, or whence we deduce no Corollaries for the good of Mankind, we ought to be as ſolid as poſſible; becauſe thoſe Things, which to us ſeem only Matters of Speculation, may to After-ages become the Foundations of uſeful Practices. But we ought eſpecially to be careful not to ſet up a Theory that is doubtfully founded, in Matters of Practice; when theſe perhaps may have the greateſt Conſequences. 'Tis no better than acting the Empirick; perhaps much worſe; becauſe one is not ſo apt, from Want of Succeſs, to amend, and alter a Practice which he holds

good, as being eſtabliſhed on the Baſis of what he thinks a ſound Theory.

I ſhall give an Inſtance, becauſe it is to my Purpoſe at this Time, in one of the moſt generally received Opinions in Phyſick, held by ſome of the greateſt Maſters in it; which to me ſeems at beſt doubtfully founded, and upon which a bad Practice may be built; I mean the Theory of *Animal Heat*. An Accident in Practice gave the firſt Riſe to my thinking ſeriouſly on this Subject; it was the Difference of Opinions about the Cure of a Gentleman, who was voiding vaſt Quantities of Blood at the Noſe. One of his Phyſicians had bleeded him ſeveral Times, and propoſed to put his Legs into warm Water, to make a Revulſion, and diminiſh the Force of the Solids in general; the Attrition of which, he ſaid, had heated the Blood extremely: All was done to no purpoſe. The other maintained the Diſeaſe to be owing to an inteſtine Ebullition of the Blood, (which he compared to a boiling Pot that ſubſides on pouring in cold Water), and that this Effervescence would cool, as ſoon as a ſmall Portion of any ſtrong Acid could be mixed with the Blood. He accordingly gave a few Gutts of Oil of Vitriol in Juice of Lattuce, and repeated it once and again after a few Minutes. In leſs than half an Hour the Bleeding ſtopped. I will not determine which, or if either was in the right: But I think it is a Service done to Mankind, if we can ſhew that a Theory is at beſt but doubtful; and that therefore it is not ſafe to draw our Practice from it.

Though the Study of the animal Oeconomy is uſeful, and entertaining to all; and is in a parti-

particular Manner neceſſary to thoſe who undertake the Cure of Diſeaſes; yet, alas, our Knowledge in ſome Parts of it, is very defective. One Part of it, which, notwithſtanding all the Pains the Learned have beſtowed upon it, remains ſtill in great Obſcurity, I ſhall contribute my Endeavours to clear up, as a Matter of real Importance, by attempting a Solution of this Problem.

To what Organs or Operations is the Heat of the human Body owing?

I ſhall not ſtay now to examine the long-ago exploded *calidum innatum*, nor the Diſtinction betwixt *innate* and *influent Heat*, on which Figment moſt of the Medicine in former Ages was unhappily founded; but ſhall go on directly to conſider ſome of the Opinions that at preſent prevail.

The *Firſt* is, That the Heat of our Bodies is owing to the mutual Attrition of the Arteries and Blood.

The *Second*, That the Lungs are the Fountain of this *Heat*.

The *Third*, That the Attrition of the Parts of the Solids on one another produce it.

The *Fourth*, That it is to be imputed to the mechanical Attrition of the Particles of our Fluids. To which I ſhall add a

Fifth, which is more neglected, namely, That whole Proceſs by which our Aliment and Juices are conſtantly undergoing ſome Alteration.

I. Then, it is generally taught, that this Heat is owing to the Action of the Arteries upon the Blood.

The Favourers of this Opinion pretend both to prove it, and account for it.

1. They endeavour to prove it from many Topicks, ſuch as: That if an Artery is tied or cut, the Part to which it goes, turns cold. On the ceaſing of the Pulſation of the Arteries, Cold and Death follow. An Increaſe of Heat attends a briſk Circulation, and a languid Circulation is accompanied with ſmall Heat. One who burns in a Fever, or is hot with Exerciſe, has a full and frequent Pulſe; in cold Faintings, *Chloroſis*, *&c.* the Pulſe is ſmall and ſlow. To theſe they add, That the Thermometer ſhews the arterial Blood to be a little hotter than that of the Veins.

2. They account for it, from the conical Figure of the Arteries; from their Flexures and Branchings into exquiſitely ſmall Capillaries, whence the Reſiſtance, and conſequent Attrition, muſt be great; from the Number, Strength and Elaſticity of their Coats; from the propelling Power of the Heart, and their ſtrong Reſiſtance. From all theſe they infer, That the Particles of the Blood perpetually getting new Motions, Directions and Rotations, are attenuated, condenſed, have their Angles grinded off, and are made homogeneous; thence, they ſay, follow the *Fluidity*, *red Colour*, and *Heat* of the Maſs which is here perfected.

I ſhall not examine this plauſible Theory narrowly, only hint a few Things that ſeem to make it doubtful.

1. Then, as to the Proof, it ſeems lame.

For

For *(a)* what is ſaid of Arteries, may be ſaid of any other Parts neceſſary to Life; the Lungs, Brain, Nerves, *&c.* becauſe, on the ceaſing of their Functions, Life and Heat fail. *(b)* Nor do we find theſe two, I mean the Heat and Pulſation of the Arteries, keep together in any regular Proportion: In ſome morbid Caſes there is a great ſenſible Heat, and a ſmall Pulſe; and in others a full enough Pulſe, and very great Coldneſs. I ſhall bring no other Evidence for this than one Inſtance, from an Author neither ſuſpected of Diſhoneſty, nor of being biaſſed by Theories; I mean *Sydenham*, who, writing on the hyſterick Diſeaſe, ſays, *Quam quidem refrigerationem, haud ſemel, iſti, ferè quâ rigent cadavera, parem comperi, pulſu nihilominus rectè ſe habente.* Beſides, *(c)* all that the Demonſtration proves is, that the Motion of the Arteries and Heat are generally in Proportion; which, admitting it to be true, leaves us at a Loſs to find out, which is the Cauſe and which the Effect, and indeed whether either is the Cauſe or Effect of the other; ſince both may be the Effects of ſome other Cauſe: For the Argument will conclude equally well the other way; That ſince the Arteries beat quicker and fuller when I am heated by Wine, Fire, or Exerciſe; therefore the Heat is the Cauſe of this increaſed Pulſe. *(d)* As to the Proof by the Thermometer, till it is well vouched, I muſt be forgiven to doubt of it. I lately attempted the Experiment, and endeavoured, after having laid the jugular Vein and Carotid Artery of a Calf bare, tied them, and cut them off at once, to let as equal Quantities of Blood as I could, flow, in equal Times, into

into equal Cups, in which were pretty well adjuſted Thermometers. The Reſult of the Experiment was ſo far from diſcovering the arterial Blood to be warmer than that of the Veins, that, in leſs than a Minute, the Thermometer which was in the venal Blood, roſe ſeveral Degrees above that which was in the other. The Difference was indeed ſo great, that I imagine there muſt have been ſome Miſtake or Miſmanagement in making the Experiment; and therefore build nothing on it, till further Trial bring us to a Certainty. *(e)* What will add to my Doubts of the arterial Blood's being hotter, till it is proved, is, that the venal Blood does not coagulate ſo ſoon as the arterial. The other Arguments brought to prove this Theory, are liable to the like Objections; therefore I may ſafely conclude, that it is not as yet eſtabliſhed by any ſatisfactory and convincing Proof. I ſhall then go on.

2. In the *ſecond* Place, to examine a little the Ways by which they account for their Hypotheſis. And, *firſt*,

(a) As to the conical Figure of the Arteries, it gives me real Offence, to ſee the noble Means of extending and applying natural Knowledge, I mean the Mathematicks, abuſed, and brought in to help out a Theory. The very Word *conical* carries a great Weight with it; and now-a-days every body ſays the Arteries are *conical*. But I cannot allow them to be Cones, ſo as to infer the Action of a converging Canal on its Contents. If one looks carefully at Portions of Arteries injected, he will be ſatisfied that they are not Cones to the Senſe, as ſome

some Authors call them. In examining narrowly the Figures of the Vessels from *Italy*, presented to the Royal Society by Mr. *Evelyne*, the Tables of *Eustachius*, *Vesalius*, *Casserius*, *&c.* in all of them we find the Portions of the Artery betwixt the Ramifications to be for the most part cylindrical, and to diverge as frequently as converge. No doubt, as the Branches draw off the Blood, the Trunk diminishing may, in a gross Sense, be called conical; and I shall allow them to be so, as far as this Figure goes, and that *A* is a much larger Section than *X*. But, as the Blood moves slower at *X* than at *A*, it is contrary to the well known Laws of the Hydraulicks, to apply the Effects of hollow Cones on Liquors

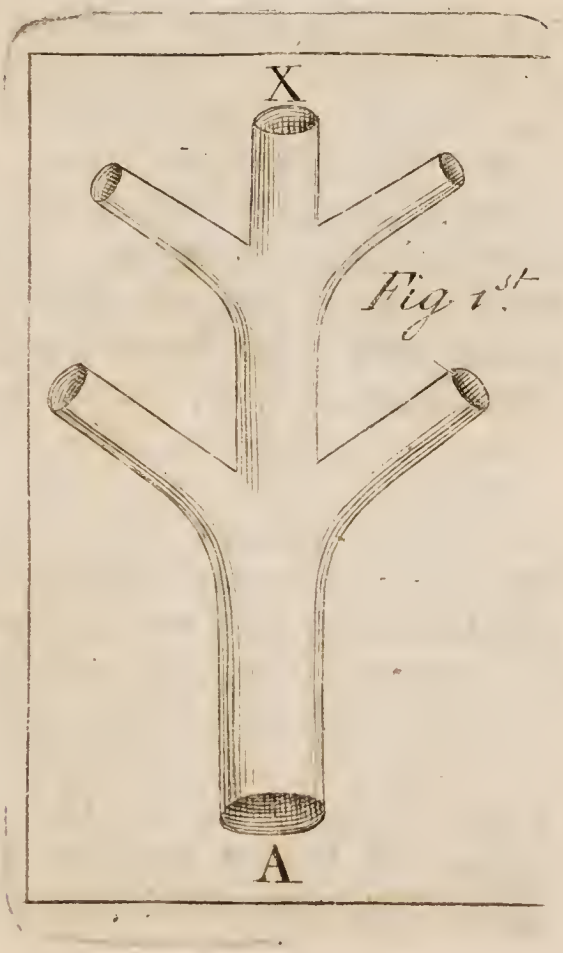


Fig 1st

Liquors flowing in them *à baſi ad apicem*, to the Action of the Arteries on the Blood; ſince in the firſt the Liquor muſt neceſſarily flow quicker at the Top of the Cone; and in the Arteries we find the Blood moves ſlower the further it is removed from the *Aorta*, which they conſider as the Baſe of the Cone. The arterial Syſtem may, with more Propriety, be ſaid to reſemble Cylinders, frequently divided and ſubdivided, ſtill terminating in Numbers of ſmaller Cylinders, the Aggregate of which is always of greater Capacity than the Trunk, or larger Cylinder before the Ramification. If they will have the Artery a Cone, let it be inverted, and let the Blood flow from the Top to the Baſe, as it really does: But then down falls all that fine Reaſoning that is founded on the Doctrine of the Cone. 'Tis Pity our great Maſters ſhould be led by mathematical Speculations, and not by their Eyes; aſſuming doubtful Facts, and reaſoning mathematically on them. Thus here, ſome of them take for granted, that the Power forming the Arteries is the Blood driven through them by the Heart; then, according to the known Laws of Hydraulicks, they ought to be conical. But this Doctrine is at beſt *gratis dictum*. One might, perhaps, on the ſame Principle, reaſon about the conical Shape of the Guts, though we know that they were formed before there were Contents to diſtend and give them Shape. But what mechanical Powers gave Form to the Air-veſicles of the Lungs? No body can imagine theſe were formed by any Contents; the great Architect having made their Cavities for their *final Uſe*, the *procuring Cauſe* is beyond

yond the Reach of our Philoſophy. May not the Arteries alſo have owed their original Form, in the ſame Manner, to that plaſtick Power, of which we know very little; and not to the Blood, which they were deſtined and prepared afterwards to tranſmit?

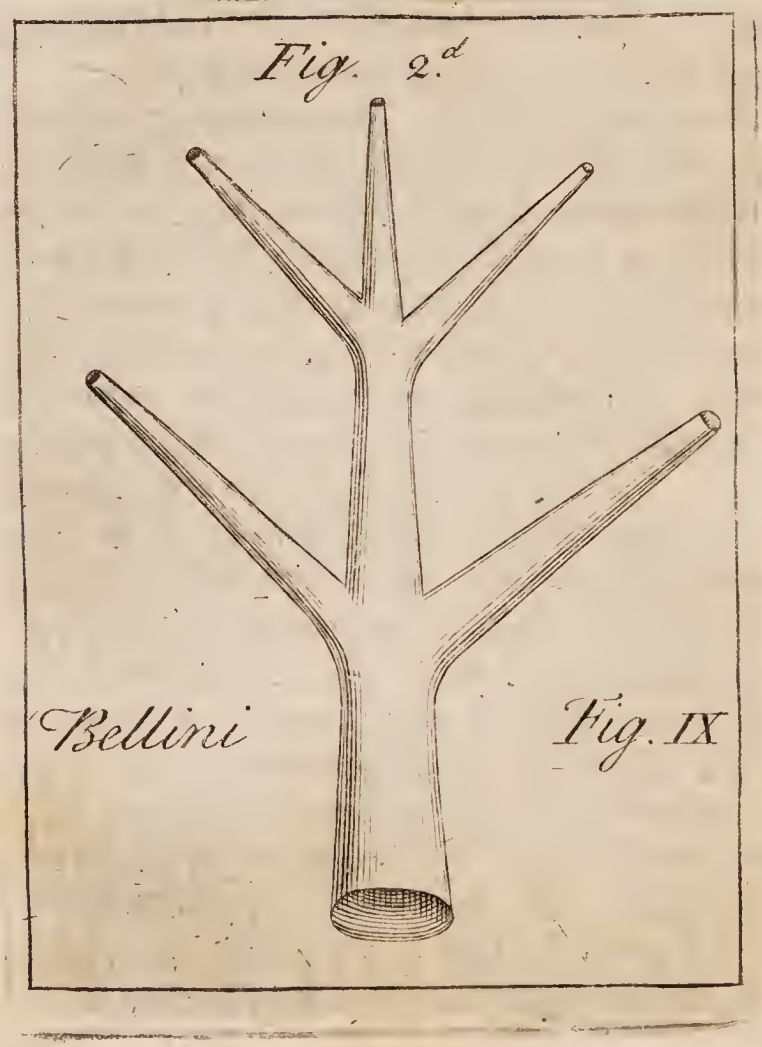
This Doctrine has been of late ſo generally taught, that there is hardly a modern Book, in which there is any thing of medical Theory, that does not mention the conical Form of the Arteries; I hope therefore I ſhall be forgiven if I make a ſhort Digreſſion, and examine how a Doctrine that ſeems at once to contradict our Senſes, and the common Laws of Hydraulicks, came to be ſo univerſally received.

One able Theoriſt, even without deſigning it, is capable of miſleading the whole Schools; eſpecially if he happens to employ a mathematical Figure and a Demonſtration: For thoſe who come after, are ſeldom at Pains to examine the Foundation; whether it be a true Principle, or only a Suppoſition, that may or may not be; whether it is an expreſs Demonſtration of a Doctrine, or only an Illuſtration, where more Latitude may be taken, and where there is no Neceſſity of being tied down to phyſical Truth.

The great *Bellini*, not miſtaking, I hope, but miſunderſtood, has given Riſe to the ſubſequent Opinions about the Form of the Blood-veſſels. In his Treatiſe *De motu bilis* ſome miſleading Ways of ſpeaking have occaſioned all theſe Miſtakes. In his *Prop.* 26. he ſays, *Si canales ſint anguſtiſſimi ad orificium minus, quemadmodum ſunt canales minimi cujuſcunque animalis, &c.* ——*ita liquidum fluens per ejuſmodi conicos canales*

canales exiliſſimos, nitendo in orificia anguſtiſſima, ſibi ipſi eſt fluendi vis & impedimentum. In the 28th he hath theſe unhappy Words: *Quoniam enim univerſa arteriarum ſeries conica eſt, & fluxus ſanguinis per ipſas eſt ab ampliori orificio verſus anguſtius.* Theſe and two or three more ſuch Expreſſions, with his 9th Figure, (which I here ſubjoin), have made the Writers after him take theſe Things for demonſtrated, which are neither true, nor, in my Opinion, meant by him to be thought true.

What



What makes me abſolve *Bellini* is, *firſt*, The Improbability of his believing and teaching a Doctrine attended with one of theſe two Conſequences; either the Abſurdity of a Liquor's flowing in a full conical Canal *à baſi ad apicem*, and yet moving ſlower at the Top than at the Baſe; or this Falſhood, that the Blood flows quicker in the ſmall Veſſels than in the *Aorta*; the contrary of which every Boy, who has once ſeen the Circulation through a Microſcope, knows. But, in the *ſecond* Place, I think *Bellini*, if he is attended to, clears himſelf. Even in his *Prop.* 27. where he uſes that unlucky Figure, he not only has the Words *quaſi conicus*, as a Caution againſt Miſtakes; but the Tenor of the Demonſtration ſhews, he means *conical* only in the lax Senſe, in which a Tree may be called conical, the Trunk ſtill decreaſing as the Branches derive from it; and he uſes the Compariſon of a Fir-tree, which, from the Top to the Ground, excluding all Conſideration of the Branches, may be called a Conoide. Further, in his *Prop.* 28. he demonſtrates, that let the Arteries be cylindrical, or of any other Shape, the Blood will ſtrike againſt their Sides, as if they were conical; and that therefore the Demonſtration, on the Suppoſition of their being Cones, will hold, though they are really of any other Shape: And (though he ſpeaks doubtfully of their Form) he ſeems to mean no more, than that he uſed the Cone for Facility of Demonſtration; Matters being much the ſame in a Syſtem of infinitely divaricated Canals, as to the *Occurſus* and *Impedimenta*, which were the main Things he had to ſet forth. Moſt of *Bellini*'s

Followers, not obſerving fully his Purpoſe, have taken him too literally; and what he intended only by way of Illuſtration of the *Obſtacles* and *Reſiſtances* the Blood had to overcome in its Way from the Heart to the Veins, they uſe as a ſtrict Demonſtration.

The celebrated *Boerhaave*, treating of the Fabrick of the Blood-veſſels, trod in *Bellini*'s Footſteps, both in embroiling the Subject, and in part clearing it up again. He ſays in his *Inſtit.* § 132. *Arteriæ quidem cernuntur eſſe canales ad ſenſum conoïdei.* And § 142. *Ergo vitalis cruor fluit quidem per arterias, ſed fluxu eunte à corde ad extrema, ex latiori in anguſtiorem partem.* And § 215. *Cruori pulſo in arteriam reſiſtit ſanguis arterioſa vaſa replens, conica arteriæ figura.* And § 217. *Quia ergo omnis omnino ſanguis tanta vi agitur, & ingenti adeò obſtaculo repellitur, in canali pleno, conico,* &c.

Theſe and ſuch like Expreſſions are apt to miſlead thoſe who have any Notion of the Figure of a Cone, and hear the Form and Properties of hollow Cones applied to the Arteries. Yet, after all this Pomp of mathematical Science, ſo capable of amuſing Scholars, the plain Truth muſt come out: And, in my Opinion, he ſolves all by ſaying, § 222. *Quia vero arteriæ ſenſim augentur numero, & capacitate——erit itaque, cæteris paribus, velociſſimus circa cor, tardiſſimus remote à corde, motus humorum circumeuntium.* This is all I want; for when this is granted, it at once deſtroys all the Arguments which their Followers have built upon the Cone. I have inſiſted, perhaps, too long on this Head; but the

the Streſs of the Argument being commonly laid here, I could not avoid it.

(β) As to the Number, Strength, and Elaſticity of the Coats of the Arteries, which are ſaid to cauſe this Heat; they ſeem to me unfit to produce it, and indeed to be no more than enough to carry the Blood along to the numberleſs Places where it is to miniſter to the ſeveral Functions of the different Parts. The Blood in them moves every Moment ſlower, which perhaps may be in order to give the Particles Leiſure (if I may ſo ſpeak) to riſe, ſubſide, attract, *&c.* ſo as to form all the different Secretions. This ſeems the more probable, that we ſee Mechaniſms of wonderful Contrivance provided for making the Motion of the Blood in the Arteries ſlow, yea almoſt ſtagnant, in order to ſome Secretions. The greateſt Conquaſſation of a homogeneous Liquor, ſuch as Water or Oil, has never been obſerved to raiſe any Heat; and we have little Reaſon to expect it from the bare propelling Force of the Heart through the Arteries, and the Preſſure of their Sides on the contained Fluid.

(γ) The Heat from Attrition is chiefly laid on the infinite Ramification of the ſmall Arteries, where almoſt every Globule of Blood rubs the Sides of the Capillaries. Even here it is very unlikely that the Blood ſhould acquire Heat, if we conſider, *firſt*, that the Motion is ſlow. I have obſerved frequently a Globule of Blood take ten or twelve Pulſes to carry it paſt the Field of my Microſcope. Moreover, the Yieldingneſs of the Fibres, the Softneſs and Lubricity of the Parts of the Blood, as well as of

the Canals, make it very improbable that Heat is generated here by Attrition: And if the Motion, and conſequently the Heat, decreaſes *in minimis*, where the *attritus ad latera* is greateſt, the Matter is not mended in the great Arteries; where, though the Velocity of the Blood makes the *attritus ad latera* greater, the Portion of the Blood that touches the Canal, is too ſmall to warm the whole Section. The great ſeeming Difficulties and Reſiſtances the Blood has to overcome in the ſmall Veſſels, which have given Riſe to this Opinion, would have diſappeared, if *Bellini* and his Followers had known, and applied, the Doctrine of Liquors riſing in capillary Tubes, to the Circulation *in minimis*; or could have been ſatisfied with *Borelli*'s Illuſtration of it, by a Filter or wet Spunge, through which Water flows, without any greater Force, than the Weight of Liquor in the depending Part. And that this is the true Theory, will be readily enough believed by thoſe who are of opinion, that the Circulation begins and ends with the Veins.

I ſhall conclude what I have to ſay about their accounting for this Syſtem, with *Boerhaave*, § 220. where, enumerating the Effects of the Action of the Arteries upon the Blood, he has theſe Words: *Ex his ſequitur totius maſſæ fluor, calor, color.* There are ſtrong Preſumptions, of which we have above alledged one, againſt the greater Fluidity of the Blood in the Arteries. That it gets its Colour here, is certainly not true, the Blood firſt appearing florid in the pulmonary Veins. And as it has its Colour before it arrives at the left Ventricle,

cle, for any thing I have yet ſeen to the contrary, it has its Heat before it comes to the right; at leaſt the Blood's acquiring Heat in the Arteries, more than elſewhere, has not hitherto been evinced, either by ſatisfying Argument or Experiment. Indeed, ſo little convincing has been ſaid on this Head, that one would be almoſt tempted to imagine, that this Opinion owed its Origin to the Difficulty of ſeparating the two Ideas of *red* and *hot*, which go ſo oft together.

However frequently we may obſerve various Effects from one Cauſe; yet, ſince we ſee ſo many other important Purpoſes of the animal Oeconomy obtained by the Motion of the Blood in the Arteries; ſuch as, Nutrition, Secretions, Excretions, and moſt of the conſiderable animal Functions; it ſeems to be quite unneceſſary, to aſcribe alſo the *warming*, *fabricating*, and *perfecting* the Blood to them alone, unleſs we can find no other *Officina* for theſe; eſpecially if we conſider, that the Blood could hardly receive any Benefit of that kind, in ſome of the Arteries of greateſt Importance, in which it has very ſhort Time and Way to run, as in the *Coronaries*: And if not neceſſary in them, why in others? how much more natural is it, if we can find another Fountain of Heat more plauſible, to reſt ſatisfied, that the Arteries have Offices enough, in carrying along the Blood; diſmiſſing what is uſeleſs and noxious; ſeparating and applying what is fit for every Part; and returning the Remainder to the Veins, to be repaired and rendered fit for a new Circulation.

The Conſtruction of the Arteries, ſo as to admit

mit no Mixtures of any kind, or no immittent Veſſel of any other kind, ſeems to be an additional Preſumption againſt their being the *Officina* where the Blood is perfected: For, except its Motion, which is every Moment growing ſlower, and ſuch Attrition as they can give it in that Motion forward, it can have nothing to promote its Perfection; whereas, in the Veins it meets with new Matter every now and then, from all the different Parts of the Body, and particularly with new Chyle; and in the Lungs with what we ſhall not at preſent give a Name to.

If it be objected, ſince the Blood acquires no Heat from the Veſſels, why does the Heat ceaſe when their Motion ſtops? I ſhall at preſent admit the Fact, (though I don't think it true, for Reaſons to be given at another Time), and grant, that the Circulation promotes the Heat, in ſo far as it moves the heterogeneous Maſs, and makes its Inteſtine Action much greater than it would be in a ſtagnant State: But from this to infer, that the Attrition of the Solids on the Fluids is the Cauſe of animal Heat, would be as unlike a Philoſopher, as it would be for one who, ſhaking a Bottle containing an effervescent Mixture, would entirely paſs by the inteſtine Motion, which is much augmented by the ſhaking, and attribute the whole Heat to the Action of the inner Surface of the Glaſs on the contained Fluids. Having advanced ſome Reaſons for doubting that the Blood owes its Heat to the Arteries, I go on to the ſecond Opinion;

II. Which is, *That the Lungs are the Fountain of Heat in the human Body.*

As I am neither able nor willing to write a Volume

Volume on the abſtruſe and wide Subject of Reſpiration; I ſhall only hint at a ſmall Part of what is moſt to the preſent Purpoſe.

In the Theory that now prevails, all that was ſaid for the Blood's being heated in the Arteries, is repeated in the Lungs, with conſiderable Addition, *viz.* That in the Lungs the Blood-veſſels every where attend, divide and ſubdivide along with the Ramifications of the Wind-pipe; and as theſe are perpetually changing their Situation and Form, becoming longer or ſhorter, making more acute or more obtuſe Angles; ſo muſt the concomitant Blood-veſſels every Moment make new Angles, and give the Blood new Directions: That at laſt the Blood enters into an exquiſitely fine Net-work, ſpread every where on the vaſtly thin Air-veſicles, where theſe little Air-bladders are perpetually changing their Angles, Points of Contact, their Form, Volume, Interſtices, and ſo forth. From theſe, and the Elaſticity of the Air, and the Weight of the Atmoſphere, the Blood is ſaid to be churned, preſſed backward and forward, broken and kneaded together, diſſolved and condenſed, made *red* and *hot* in Reſpiration. This makes a plauſible Theory, but does not ſatisfy me, for theſe Reaſons.

1. What was ſaid before, of the Improbability of Heat's being generated by the ſole Attrition of Solids on Fluids, is as ſtrong here, as it was in the Argument concerning its being produced by the Action of the Arteries in general.

2. Though the Lungs be regularly ſupplied with plenty of Air, that has Weight and Elaſticity

ſticity enough to carry on the alternate ſwelling and ſubſiding of the Veſicles, which ſhould anſwer all the Purpoſes of this Theory; yet Life and Heat ſoon fail, if that Air has, by paſſing through the Fire, or any other Way, been robbed of ſome Particles or Quality, different from its Weight and Elaſticity.

3. The Argument from the additional Action of the Solids of the Lungs on the Blood, more than what is found in the Arteries, from their greater and conſtantly varying Motion, ſeems to be fully taken off by one Part of *Hook*'s Experiment, exhibited before the Royal Society. Dr. *Hook* having fixed the Noſe of a double Pair of Bellows in the Wind-pipe of a Dog, and cut away the Ribs, Diaphragm and *Pericardium*, and pricked all the outer Coat of the Lungs, that Plenty of Air might get out; he then made a conſtant Blaſt, by which means the Lungs were always kept very full, and without any Motion. The Dog lived, and his Heart beat regularly. This ſerves to ſhew, that the Animal can live, and the Circulation go on well, when the Veſicles are conſtantly and equally diſtended; and conſequently that there is no Need for that frequent and great Variation of Angles and Points of Contact, upon which the modern Theoriſts build their additional Attrition. This being all I wanted from the Experiment, I might paſs the reſt of it; but, as it lies in my Way, I ſhall add the Remainder, with his Reaſoning upon it, though I am not ſo well ſatisfied with them. On ceaſing the Blaſt, and ſuffering the Lungs to ſubſide, the Dog fell into dying convulſive Fits, but recovered on renewing the Fulneſs of the Lungs,

Lungs, with the conſtant Blaſt of Freſh Air. At laſt, cutting off a Piece of the Lungs, he ſhewed, that the Blood paſt eaſily through them, both when expanded conſtantly, and when they were ſuffered to ſubſide and lie ſtill. From theſe he argues, *That as the bare Motion of the Lungs, without freſh Air, contributes nothing to the Life of the Animal, he being found to ſurvive, as well when they were not moved, as when they were; ſo it was not the ſubſiding or Moveleſſneſs of the Lungs that was the immediate Cauſe of his Death, or the ſtopping of the Circulation of the Blood thro' the Lungs, but the Want of a ſufficient Supply of freſh Air.*

I doubt of a Part of the Experiment, and am far from being perſuaded that his Argument is concluſive the Length that he urges it; becauſe there may be other Purpoſes gained by the perpetual Play of the Lungs, beſide the Attrition, or importing into, or exporting from them, any ſalutary or noxious Particles or Qualities. I ſhall name two of them, which have been much inſiſted on, *viz.* the free Circulation of the Blood through the Lungs, and the preſſing the Blood into the left Ventricle of the Heart.

As to the *firſt*, I doubt of the Blood's circulating as freely through the Lungs in their collapſed State, as when they are inflated. That it does not, may, I think, be inferred, from there being a *foramen ovale*, and *canalis arterioſus* in the *Fœtus*, provided to carry a conſiderable Part of the Blood towards the Arteries, without paſſing through the Lungs; which, 'tis preſumed, would not have been, if the Lungs had tranſmitted

mitted it freely in their collapſed State. Nor do I think the Blood's flowing when Dr. *Hook* cut off a Piece of the Lungs, any Demonſtration that it circulated freely through them when collapſed; becauſe, if any Branches of the pulmonary Artery are cut, they will not only yield Blood, tho' the ſmall Veſſels are obſtructed, but pour it out the more freely, that the Capillaries, which naturally ſhould receive it, are not able to tranſmit it.

As to the Blood's being preſſed into the left Ventricle by the Play of the Lungs; this not only bears a great Shew of Probability, but is alledged by ſome to be the main, if not the only Uſe of the Lungs; without the Aſſiſtance of which, it is ſaid, the left Auricle and Ventricle could never have been filled. I am apt to believe that there is ſomething in this, from the Senſe of Suffocation felt immediately, or very ſoon after the Lungs are at reſt. And I can eaſily grant, that as Nature, from one Cauſe, produces frequently, beſide the main Effect, alſo other ſubſidiary Advantages; ſo here, the Blood may be aſſiſted in overcoming the Reſiſtance of the ſtronger left Ventricle. But, as it is not to be imagined, that ſo large and complex a Machine as the Lungs, ſhould be contrived for no other Uſe, but to puſh the Blood into the left Ventricle, (for which Purpoſe the *Sinus venoſus* and left Auricle are provided with muſcular Coats), we have Reaſon to ſuſpect, that there are other great Purpoſes anſwered, which could not be ſo well attained without this grand *Apparatus*. But as theſe have nothing to do.

do with heating or cooling the Blood, I only touch them by the by.

Though I am unwilling to enter upon any Arguments againſt the Blood's being heated in the Lungs, from other Cauſes than the Attrition, with which chiefly I have to do; yet I cannot avoid adding ſome Reflexions, which make me imagine, that the Blood does not acquire Heat in the Lungs at all. Indeed I am induced to think in this Way, whether I conſider the Office of the Lungs *à priori*, or *à poſteriori*; whether I conſider the *Cauſe*, or the *Effect*. For,

4. It ſeems a very unfeaſable Opinion, that in the ſpongy Lungs, on the numberleſs Air-bladders, of which the Blood is ſpread almoſt ſuperficially thin, the Effect of the cold Air's ruſhing into theſe Veſicles, and touching, or almoſt touching this thin Surface of Blood; that this Effect, I ſay, ſhould be to make the Blood hot. This appears to me to be an Aſſertion ſo odd, that no bare Hypotheſis, or favourable Conjecture, can make it go down, without ſome ſtrong Proof; and hitherto none has been produced. And as the Cauſe appears not at all promiſing *à priori*, ſo the Effect ſeems to demonſtrate this not to be the Cauſe. For,

5. That the Blood is *de facto* rather *cooled* than *heated* in the Lungs, may be inferred from the Comfort and Benefit received by the Inſpiration of cool Air, in many inflammatory Diſeaſes, eſpecially thoſe of the Lungs. In burning Fevers, with a full quick Pulſe, red Skin, and a large and quick Reſpiration, I have oftener than once given preſent Relief, by opening a Window, and admitting a Stream of cool Air

to

to breathe in: The Effects of which I have carefully obſerved to be, that (though the Body continued cloſe covered) in one Minute the Reſpiration became ſlower; and very ſoon after the Pulſe was abated of its Fulneſs; and not only the Face, but the whole Body, of its fiery Heat and Colour.

6. If the Blood were heated in the Lungs, one would be apt to think, that we ſhould need leſs of their Function when we are warm, or in a warm Place; the Heat of our Bodies, or of the Atmoſphere, doing ſo much of the Office of the Lungs; and that we ſhould want more of it when cold, or in cool Air. But it will occur to every Body, that when we are hot and want to be cooled, we breathe full and quick; and when we are cold and want to be warmed, our reſpiration is ſlow and ſmall, contrary to what one would expect, if the Action of the Air on the Blood in the Lungs were to heat it.

7. If I were fond of ſtraining for Arguments on this Head, I might adopt *Helvetius*'s Syſtem. But I ſhall not enter far into the Diſpute betwixt him on the one Side, and *Santorini* and Dr. *Nichols* on the other, about the Capacities of the Ventricles of the Heart, and of the Veſſels leading to and from them. For, conſidering how difficult a Thing it is to take the preciſe Dimenſions of theſe Parts, and how apt the beſt Men are to find Things according to their Wiſhes, we cannot depend on the precarious Meaſures of thoſe who are labouring to eſtabliſh or overturn a Theory. I am indeed inclined to believe that there is more in *Helvetius*'s Opinion, than his Opponents will allow;

allow; and that the Meaſures will not commonly come out as *Santorini* found them, by what *Harvey* ſays in his Proem. *Vena arterioſa vas amplum cum tunica arteriæ factum; arteria venalis vix pari magnitudine cum tunica molli laxa.* But all the Uſe I ſhall make of their Diſpute is, to infer, that, ſince even thoſe who write againſt *Helvetius* bring no Experiments to ſhew that the Blood comes from the ſmall Veſſels of the Lungs more expanded than before, we have no Reaſon to believe that it is rarefied by that Function. And though they ſhould prove againſt him, that the Blood is not more condenſed; yet, if they cannot likewiſe prove that it is more rarefied, I ſhall doubt of its acquiring Heat here: For moſt Liquors rarefy by Heat, and few more than Blood; as I hope to make evident when I come to treat of the *warm Pediluvium.*

8. I ſhall conclude my Reaſons for imagining that the Blood does not owe its Heat to the Action of the Lungs, with this: That I ſuſpect we muſt look out for another Source of Heat in the Egg and Fœtus: And Cauſes are not to be multiplied without evident Neceſſity. To the Objection, That the Heat of the Mother is ſufficient for the Purpoſe till this new Function comes into Action, I oppoſe two Obſervations. The firſt is, That, toward the End of Incubation, an Egg may be left by the Dam, in a cold Seaſon, for a longer Time than would be ſafe for the Chick, if all its Heat depended on her; yea long enough for an Egg that contains no warm Principle, to become of the Temperature of the ambient Air: yet, on opening it, the

Chick has been found neither quite ſo cold, nor dead. The ſecond is, That a ripe Fœtus, taken away from the Mother, but continuing within the Membranes, can live ſeveral Hours by its own Heat, without any Aſſiſtance from the Lungs. Therefore I ſhall continue to ſuſpect this Theory, till the Patrons of it ſhew the Cauſe of Heat, before the Lungs acted; and alſo account for the failing of that Source, upon the Lungs coming in to play. Having ſaid enough on this, I go on to the

IIId Opinion, which ſhall be diſpatched in a few Words. It is, of ſome who being ſuſpicious that the Action of the Veſſels on the contained Fluids could not generate Heat; yet, being wedded to the Notion that the Cauſe of Heat is to be ſought in the Solids, make it owing to the Action of their Parts on one another. The Heart and Arteries move moſt; and it ſeems natural to expect that the Heat ſhould be owing to this Motion. But even this does not ſeem very probable, from theſe few Conſiderations, among many others.

1*mo*, The moving Parts, however we term them *ſolid*, are neither hard nor dry; which two Conditions ſeem abſolutely requiſite to make them fit to generate Heat, in the coarſe mechanick way of Attrition.

2*do*, None of their Motions are ſwift enough to promiſe Heat in this Way.

3*tio*, Their Motions are very ſmall; or, in other Words, they have no great Change of Surface in their Attritions.

4*to*, The moveable Fibres, as far as we can trace them by the beſt Microſcopes, have, to the

the laſt *Stamina*, Fat, Mucilage, or Liquors every where ſurrounding them, provided by Nature, to prevent their being deſtroyed, or heated by Attrition. I come now to the

IVth Opinion, about the Cauſe of Heat in our Bodies, which adds to the Attrition of the Veſſels on their Contents, *The mechanical Attrition of the Particles of the Fluids on one another.*

I omitted this in the firſt Edition, imagining, that what was ſaid about the Conquaſſation of Liquors, which is the readieſt mechanical Way we have in our Power of raiſing this Attrition, was ſufficient to ſhow the Doubtfulneſs of this Hypotheſis. Referring therefore to what is ſaid above, and afterward in the Preliminaries to the fifth Opinion, as to the *Effect* of this Attrition, I ſhall only ſay as to the *Cauſe*, that thoſe who ſupport this Hypotheſis muſt not only ſuppoſe that *mechanical Attrition* begets *Heat*, but begets *itſelf* without Diminution. They muſt not only ſhow what ſets this Attrition a-going, but what maintains it; for all mechanical Force perpetually decreaſes in a reſiſting Medium. In ſhort, they muſt ſhow the Poſſibility of a *perpetuum mobile*, the Impoſſibility of which they themſelves demonſtrate.

It was in an evil Hour that *Des Cartes*, reviving the old *atomical Philoſophy*, and ſtrengthening it with a higher Geometry, carried all before him. For ſoon it got too far into Phyſick, run away with the Theory, and hurt the Practice of Medicine in many Inſtances. Matter and Motion became all in all: Theſe were thought to be within our Ken, and ſubject to our Demonſtrations.

Straightway moſt of the Men of Genius were employed in an Attempt to ſubject the whole corporeal World in general, and particularly the *animal Oeconomy*, the *Forms of Diſeaſes*, and the *Operation of Medicines*, to a Set of *mechanical Laws*, which were endeavoured to be introduced into many a Province to which they can never reach.

Every thing was promiſed, and great Matters were undertaken. Not content with the ingenious and uſeful Application of Levers, Ropes and Pulleys; to the Bones, Muſcles and Tendons, and other valuable *mechanical* and *hydroſtatical* Purſuits: Not content with theſe, I ſay, Millſtones were brought into the Stomach, Flint and Steel into the Blood-veſſels, Hammer and Vice into the Lungs, *&c.* But all to no good Purpoſe; there being certain Bounds beyond which mechanical Principles and Demonſtrations do not reach. Within theſe our Diſquiſitions may be entertaining and uſeful; and a modeſt Philoſopher will ſtrive to diſtinguiſh the Field of mechanical Knowledge from what is beyond its Precincts, and not endeavour to apply the *mechanical Laws* further than he ſees them applied in Nature; knowing, that not only the *Primordia* of Animals, but every animal Function almoſt refuſes this Subjection, being formed and conducted by a *divine Set of vital Principles*, an *inward Life and Motion*, which mocks all the bold, vain and frivolous Attempts of our modern Philoſophy.

Though I imagine there is another Cauſe of this Heat, and am not for multiplying Cauſes without Neceſſity, I ſhall allow, to ſuch as are tenacious

tenacious of the Opinions already mentioned, that what they hold to be the Cauſe, may conſpire with the following, which I take to be the principal one.

Vth Opinion about the Cauſe of the Heat of our Bodies, is what I call THE ANIMAL PROCESS: or, *That Proceſs by which our Aliment, and Fluids, are perpetually undergoing ſome Alteration.*

Before I begin to explain what I underſtand by this Proceſs, I beg Leave to premiſe a few Things, moſt of which are granted by every body.

1*mo*, The inteſtine Action of the minute Parts of mixed Bodies on one another, is capable of producing as great, or greater Heat, than can be produced by the mutual Attrition of the Surfaces of the hardeſt Bodies. From Gun-powder will ariſe as great and ſudden Heat, as from Flint and Steel.

2*do*, The Parts of mixed Fluids acting on one another, are capable of raiſing great Degrees of Heat; as well as thoſe of Solids upon Solids. Every body, a little verſed in Chymiſtry, knows that there are cold Liquors, which, when mixed, produce inſtantly a fierce Flame.

3*tio*, No Attrition or Action of any ſolid Body on any homogeneous Fluid, has been ſhown to create Heat. Water, Oil, and the like, have been conquaſſated long, with the greateſt Violence, without being in the leaſt warmed. Nor does the Experiment brought by *Albinus* and my Friend Dr. *Martin*, of Cream's becoming warmer by being churned, infer any thing to invalidate this: the Heat there

ſeeming rather owing to a chymical, than a mechanical Cauſe; and to be an Effervescence happening on the Alteration, by which the component Parts of the Milk, which is a heterogeneous Subſtance, are changed and ſeparated, in making Butter.

4*to*, No conſiderable Alteration of mixed Fluids has been obſerved to be made by the moſt violent mechanical Agitation of their Particles, joined to the ſtrongeſt Action of Solids on them. No churning of a vegetable Juice attenuates its Oil into Alcohol; no Conquaſſation of a Lixivium changes the Salt of it from a fixed to a volatile Nature, as far as we know at leaſt.

5*to*, It is agreeable to the Laws of Natural Philoſophy, to reaſon on the Chymiſtry of the animal Body, as well as on the Mechanicks of it. The beſt Philoſophers have perhaps been the beſt Mathematicians; but tolerable Mathematicians have not always taken in the wide Circle of Philoſophy. In Bodies, the Conſideration of the Action of one upon another, while they can be meaſured by their Sides and Angles, is called *mechanical*, and has been well treated of by mechanical Writers: But when Bodies come to be ſo minute, that we cannot apply the ſame Laws, we give other Names to the Knowledge relating to them; ſuch as *hydroſtatical*, *chymical*, *electrical*, &c. Here, no doubt, all is tranſacted by Laws, as firmly eſtabliſhed as in the other. But the thorough Philoſopher reaſons on Fluids, and the minute component Parts of Solids, by a Set of Laws peculiar to them; and will not apply the coarſer mechanical Laws to their intimate

mate Changes, and their Actions on one another.

6*to*, Moſt of the chymical Proceſſes, where the Texture of the Subject is much changed, are attended with Heat.

Theſe being premiſed, I go on to conſider this Proceſs. In order to diſcover ſomething of the Nature of it, let us look about for ſomething analogous, and ſee if we can find any Proceſſes that come near to ours. The two moſt conſiderable and moſt common ones, by which the ſame Subjects undergo great Alteration, are *Fermentation* and *Putrefaction*.

Let us conſider ſome of the known Appearances of theſe two Proceſſes, and ſee if they can caſt any Light on the *animal Proceſs*, which I am endeavouring here to inveſtigate.

Firſt, In *Fermentation*, a few of the Phænomena are: (1.) There is a conſiderable inteſtine Motion of the Parts of the Fluid. (2.) This Motion is not owing to any mechanical Action, or Influence of the containing Veſſel. (3.) Air is ſome how neceſſarily concerned in the Proceſs, whether in being ſeparated from the fermenting Maſs, or in mixing with it. Poſſibly indeed both: For it is conſtantly emitting Air, and the Proceſs is ſoon quenched, either *in vacuo Boyleano*, or when ſhut in with a ſmall Portion of Air. (4.) It is ſtill accompanied with a ſmall, but ſenſible Degree of Heat. (5.) The Liquor becomes thinner, and groſs Lees are precipitated. Theſe are ſome of the moſt obvious Appearances during the Proceſs of Fermentation.

Secondly, After it is completed, the moſt remarkable Changes of the Subject are: (1.) The Oil,

Oil, or a conſiderable Part of it, is found ſo attenuated, and volatiliſed, as to riſe firſt in Diſtillation; and, tho' ſeparated from the Phlegm, to continue ſuſceptible of a Mixture with Water. (2.) The Salts that remain, continue ſtill fixed, and reſt with the Aſhes in Calcination, as before the Proceſs. (3.) The Subject retains its vegetable aceſcent Nature, and can be changed to Vinegar, or an acid Subſtance.

In *Putrefaction*, again, (1.) There is likewiſe a great inteſtine Motion. (2.) When carried to a Height, and the putrifying Subſtance is much compreſſed, it is accompanied with a very great Heat and Smoak, and ſometimes Flame. (3.) Air is alſo neceſſary to it. (4.) The viſible Texture of the putrifying Maſs is changed.

After the Proceſs, the moſt notable Changes of the Subject are: (1.) In Diſtillation, ſoon after a little Phlegm, with only a ſmall Fire, there ariſes a volatile alcaline Spirit and Salt. And (2.) on Calcination, there remains no fixed Salt with the Aſhes.

In the *animal Proceſs* we are conſidering, (1.) The Subject of it is moſtly the ſame with that of the other two, being at leaſt originally of vegetable Subſtances. (2.) Air is ſome way neceſſarily concerned in the Proceſs. Whether it be in mixing with the Blood, or ſeparating from it, or both, I ſhall not determine here. Thus far is plain, that our Food has Air mixed with it, our Fluids yield Air in the Pump, and we cannot ſubſiſt, either in the exhauſted Receiver, or ſhut in with a ſmall Portion of Air, ſo as to have no Communication with the Atmoſphere. (3.) It is generally accompanied in our Bodies with

with a Degree of Heat, greater than in Fermentation, and leſs than the higheſt putrifying Heat. (4.) By it the Contexture of the conſtituent Parts is minutely changed. Thus

(1.) Our Juices, which have fully undergone this Proceſs, are ſo far out of the vegetable Claſs, that they will not turn acid, but rancid. *(2.)* The Salts, which by Fermentation could not be raiſed out of the vegetable fixed State, here loſe their fixed Nature; for no lixivial Salt remains with the Aſhes in Calcination. But they are not exalted to ſuch a Degree as in the higheſt Putrefaction; where, in Diſtillation, after a little Phlegm, there ariſes early, and with a ſmall Degree of Fire, a volatile Spirit and Salt: Whereas our Blood in Diſtillation yields only Phlegm with a ſmall Fire, and no volatile Spirit or Salt for a conſiderable Time, and not without great Force of Fire.

This Proceſs may be one *ſui generis*, perhaps ſomewhat of a middle Nature betwixt Fermentation and Putrefaction; ſeeming by the Product to come ſo near to the latter, that I incline rather to call it by that Name: For there is ſuch a Proceſs; we have the ſame Materials; we have a fit Place for it; a conſiderable Degree of Preſſure by the contracting Force of our Veſſels; the Air not quite excluded, nor included; we have the Subject changed from what it was; a ſenſible concomitant Heat; and what remains after the Proceſs very near the ſame. I don't ſee more requiſite to eſtabliſh this *animal Proceſs* to be of the ſame Nature, and indeed to be a certain Degree of the *Proceſs of Putrefaction.*

Our beſt Philoſophers are agreed, that Putrefaction

faction is the moſt ſubtile of all Diſſolvents, effectually disjoining and ſeparating all the component Parts of putrifying Bodies, except Sea-ſalt. Now I imagine, in this powerful Solution of Bodies, that the inteſtine Action of their minute Particles creates, collects, or ſome way or other is the Cauſe or Means of *Heat*: For I do not pretend to eſtabliſh the preciſe Nature of *Fire*, or the Manner of its Propagation; about which ſo many Philoſophers have lately exerciſed their Talents, without being able to ſatisfy the Royal Academy of *Paris*, that ſet them to work.

All our Fluids are much diſpoſed to Putrefaction. Blood, Urine, Lymph, *&c.* out of the Body, after ſome time, become highly putrid, even in pretty cool Air, and without any Stirring or Agitation; and our Blood, and ſome of our Juices, out of the Circulation, but within the Body, change to putrid Matter.

This Pus ſhows no high Degree of Putrefaction ſoon; yet, if a very ſmall Portion of it is abſorbed into the Blood-veſſels, it raiſes a Fever, as certainly as Yeſt does a Fermentation upon Wort. I imagine this is not owing to its ſtimulating the Solids to quicker and greater Vibrations, but to its increaſing the inteſtine Action, and accelerating the Proceſs I am treating of; haſtening the Change of the animal Juices, to that ſubtile acrid State, that renders them unfit to be retained long in the Body, and diſpoſes them to run off by the Skin, Kidneys, or Guts. And, in fact, we ſee colliquative Evacuations, ſuch as Sweating and Purging, conſtantly attend theſe putrid or hectic Fevers that are owing to internal Ulcers.

Now,

Now, if the Warmth of our Bodies can operate ſuch a Change on a Portion of our Juices that is extravaſated; how reaſonable is it to conclude, that the ſame Heat makes a greater, and quicker Change, on what is contained within the Veſſels; ſince it is conſtantly moving on, and every now and then meeting with new Mixtures of heterogeneous Bodies, fit to excite new inteſtine Motions? It is true, that our circulating Juices do not ſeem to contract the ſame Acrimony, that the *Pus* we have juſt now ſpoke of does. The Reaſon of this is obvious, when we conſider the conſtant Evacuation there is of acrid perſpirable Matter, Sweat, Urine, *&c.* and that, as faſt almoſt as theſe noxious Particles are formed; in the Courſe of Circulation, they meet with various Outlets, by which they are diſcharged before they can hurt us. In their Way to the Skin, and other Strainers, they ſerve to maintain a moderate Degree of Heat, (probably the true *calidum innatum*), enough to keep us warm; but not to create a Conflagration to deſtroy us. Upon the ſtopping of theſe Evacuations, dangerous Fevers are raiſed.

Upon ſuch a nice, as well as obſcure Subject, it is natural to aſk, *Where this Proceſs is tranſacted? when it commences?* and, *when it ends?* To theſe Queſtions I do not pretend to give ſatisfying Anſwers; but ſhall finiſh what I have to ſay on this Part, by delivering a few Conjectures, which pleaſe myſelf, and may be amuſing at leaſt to others.

As to the *firſt*, *Where is this Proceſs carried on?* It gives me no Trouble to own, that I have no Notion of any fixed Place where it is principally tranſ-

tranſacted; having no *Williſian* Notion of any fervent or excandeſcent Part, the Reſidence of Heat, where the Blood is warmed, kindled, and vivified. What at preſent ſeems to me moſt probable, is, That it is proceeding conſtantly in all our Juices, eſpecially where there is Blood; and as there is three or four times more Blood in the Veins than in the Arteries, that this Proceſs is chiefly carried on in the Veins; and as the ſpecifick Coldneſs of the Air in the Lungs, ſeems apter to check than to forward it, it ſeems probable that there is leaſt of it in the Lungs. Perhaps it proceeds faſteſt in the great Veins, and particularly in that great Ciſtern or Reſervoir before the right Auricle of the Heart, (the Limits of which may be determined by the Valves of the Jugulars, Azygos, Subclavians, and Iliacks); which may be conſidered as a Working-vat, where all the Ingredients of refluous Blood, Lymph, Chyle, *&c.* mix and work together. The incomparable *Harvey's* Obſervation of what paſſes in dying Animals, and ſome other Paſſages in his Works, ſeem to favour this Conjecture. *Exercit. p.* 46. *Poſtquam cor & auriculæ à pulſatione quieſcebant, obſcurum motum & inundationem & palpitationem quandam manifeſtam ſuperfuiſſe.* And *p.* 264. *Sanguis in venis contentus (ſuo quaſi fundo), ubi copioſiſſimus (in vena ſcilicet cava) juxta cordis baſim & auriculam dextram, ſenſum ab interno ſuo calore incaleſcens & attenuatus, turget & attollitur, (fermentantium in modum), unde auricula dilatata ſua facultate pulſifica ſe contrahens, propellit eum confeſtim in dextrum cordis ventriculum.* And *p.* 275. *Diſtenſionis primam cauſam, calorem innatum*

natum eſſe, primamque diſtenſionem eſſe in ſanguine ipſo (fermentantium in modum) ſenſim attenuato, & turgente, in eoque ultimo extinctum puto. And, in his admirable Treatiſe *de gen. animal. p.* 150. 151. *Fit diaſtole in ſanguine ab interno quaſi ſpiritu intumeſcente. Quod enim in lacte ab igne calefacto, & cereviſiæ fermentatione cernimus, idem in pulſu cordis uſu venit; in quo ſanguis, quaſi fermentatione aliqua turgeſcens, diſtenditur, & ſubſidit: quod ab interno calore ſive ſpiritu innato efficitur.* I omit many Paſſages, which I think amount to a Demonſtration, that the Blood is both the *Fountain of Heat*, and the *firſt Spring of Motion*; and hope I ſhall be excuſed for bringing theſe long Quotations, conſidering they not only give an Air of Probability to theſe Conjectures; but ſeem to aſſiſt us in forming an Idea of the animal Proceſs itſelf. Teſtimonies of this kind, from an Author who inveſtigated Nature with more Abilities, Induſtry, and Succeſs, than all his Followers, muſt be allowed to have a great deal of Weight; eſpecially when we reflect, that he has no View to eſtabliſh any Opinion in the Matter we are treating of, but only deſcribing accurately what he obſerved. Before I go further, I cannot but regret, that the immortal *Harvey* is ſo ſuperficially read; there being ſcattered through all his Works more valuable Materials perhaps, both for the Uſe of the Philoſopher and Phyſician, than are to be met with any where elſe, and nothing in them that has any Tendency to miſlead us. I ſhall conclude this Article, where perhaps I ſhould have begun it, by mentioning the *firſt Concoction*. I might have conſidered what paſſes

in the alimentary Tube; in which, not only the finer Particles of our Aliment, but the coarſer Parts which come off in Excrement, are greatly changed and animaliſed, if I may ſo ſpeak; as appears from what remains after Calcination. I might have ſhewn, that this Change happens to our *Ingeſta*, by being only a few Hours in warm Infuſion with ſome of our Juices, where the Alteration cannot be imputed to any ſwift Motion, or mechanical grinding by the *Viſcera*; our celebrated Countryman's Theory of the mechanical Power of the Stomach having been long ago laid aſide. I might have run out on the Heat that muſt ariſe from theſe Subſtances in ſuch a Degree of Putrefaction, and conſidered the Contents of the Stomach and Guts, as conſtantly communicating ſome Warmth to the whole Body; but ſhall content myſelf with juſt having named them: And only add, That as Philoſophers have compared Animals to Vegetables, whoſe Roots are within their Bodies; I conſider them as having alſo their Hot-beds, needing conſtant Supplies of putrifying Subſtances incloſed within them. And though ſome may think it a humbling Reflexion, I believe it will be thought a true one, by thoſe who take a full View of the animal Syſtem; of our Food, the Changes it undergoes; of our Secretions, and particularly the conſtant Steam of Perſpiration reeking from our Skin and Lungs, That *Man's Body, of which he is ſo vain, is little better than a ſmoking Dunghill.*

I hope this will communicate no impure or low Idea to the Mind of a Philoſopher, who conſiders *Putrefaction* as one of the grand O-

perations

perations of Nature; by which the impriſoned Particles of Fire, Æther, Air, *&c.* are let looſe from their lifeleſs Priſon, reſtored to their native Liberty, and abſorbed by the common Ocean of Principles; to be again employed in new Forms of Being, according to the Will of the Univerſal Mind: Whether theſe Putrefactions are open to the Atmoſphere directly, and the reſolved Particles immediately mixed with the general Treaſure; or whether they happen in the Bodies of Animals, where, while they are diſentangling themſelves, and haſtening to their proper Natures, they are employed, by the infinitely wiſe Agent, in continuing what is called the *calidum innatum*, or *vital Flame*.

Another Queſtion is, *When does this Proceſs begin?* Which having a Connexion with a third, *viz. When does it end?* I ſhall treat them in a looſe way together.

As my Anſwer to the firſt was entirely in the conjectural Strain, I muſt continue in the ſame here. And, inſtead of expecting from me direct Anſwers, I beg the Reader will indulge me the Liberty of wandering through ſome uncultivated Fields of Speculation; where the uncommon Ideas that preſent themſelves, ſeem to open a new Light on ſome dark enough Matters, ſuch as promiſes to render ſeveral agreeable, and perhaps uſeful Inquiries, more eaſy.

As, in my Conjectures about the Place, I gave it for my Opinion, that this Proceſs was carried on univerſally, through our whole *Syſtem*; ſo here, I think, it begins as ſoon, and continues as long as the *Syſtem* itſelf. And as I imagined, that there were various Degrees of this Proceſs

in different Subſtances, and in different Places of our Bodies; here I imagine that there are various Degrees of it in different Periods.

I muſt begin, by diſtinguiſhing betwixt the *Fœtus Heat* and the *Animal Heat*; betwixt the Heat of a *Body new dead*, and the Heat of a *living Man*. There is a ſmall Degree of Warmth in the *Fœtus*, that needs the Aſſiſtance of the maternal Heat to maintain it; and there is a Warmth after Death, which in ſome Bodies laſts very long. Both theſe, I think, are ſmall Degrees of it; but not the perfect *animal Heat* itſelf, produced or cauſed by the *animal Proceſs*, which I would here explain.

Leaving to Divines and Philoſophers to determine *when we began to be*, and paſſing the *ſeminal State*, I ſhall only conſider the Creature at firſt in the Loins of the Mother, and afterwards when arrived at a more perfect Life. I imagine then, that from its firſt being a proper Subject for our Inquiries, however ſmall and inconſiderable it may appear, that ſomething of this Proceſs has been going on in an inferior Degree; and that it laſts even for ſome time after Death. In the *Fœtus*, I think it very imperfect, and not compleat, till the Animal can be called perfect; and what of it remains after Death, ſeems to be more incompleat, ſubſiſting in a Subject which is no longer an Animal at all. This Warmth of the *Fœtus*, however, is very ſmall; needing that of the Mother to cheriſh and maintain it, till the new Source of Heat comes to ſupply its Place, by the Commencement of the *animal Proceſs*.

In order to give my Opinion more fully, let us

us caſt an Eye on the Difference betwixt a *Fœtus* and a perfect Animal. A *Fœtus* depends on the Mother; an Animal depends on itſelf, and can live by its own Functions. A *Fœtus* receives its Aliment by the umbilical Cord, from the *Placenta* and Womb; an Animal from *Pecquet*'s Duct. A *Fœtus* can only apply the Nouriſhment perfected by, and received from, the Mother; an Animal can receive, elaborate, and apply what it takes in by ſucking and the Lacteals. A *Fœtus* needs the adventitious Heat of the maternal *Uterus*; an Animal can live by its own Heat, as ſoon as this Proceſs is compleat.

If you aſk me then, when the animal Proceſs commences, or when the Change of State from that of a *Fœtus* to that of an *Animal* is made; I am ready to give it for my preſent Opinion, that this Change happens, and this Proceſs begins, when we come to breathe freely.

This, at firſt Sight, ſeems to argue Reſpiration to be the Cauſe of Heat; but I do not think it does. Other Things happen at the ſame inſtant, to ſome of which, or to a Combination of them, it may be as rationally referred.

To explain this intricate Matter fully, would prove a laborious and difficult Taſk; ſuch as neither my Leiſure, nor the Nature of this Undertaking, allow me to attempt. I ſhall therefore ſatisfy myſelf with pointing out the Way, and leaving it not quite ſo dark as it has hitherto been.

When we conſider the State of moſt of the *Viſcera* before Reſpiration, and what probably happens to thoſe of the *Abdomen*, as well as of the *Thorax*, upon our beginning to breathe;

one Thing, which has hitherto been almoſt quite unheeded, will become obvious, *viz.* that there is more than one new Circulation opened.

In the *Fœtus*, the *Lungs* are in a great meaſure idle; there is an Air for them to take in, and they tranſmit only a Portion of the Blood, the whole of which they are deſtined afterwards to receive. The *Liver* ſeems hitherto to have had little Employment; for it is lateſt formed, or comes lateſt to Sight of any of the *Viſcera*; there is Bile in the Gall-bladder, and biliary Ducts; but I don't think much of it has been poured forth. The Diſputes about the *Alantois* leave it a doubtful Point, whether there is ſuch a Reſervoir in the human Subject; and in Brutes, the Collection, during the whole Months of Geſtation, amounts to ſo ſmall a Matter, that we may ſafely ſay the *Kidneys* have had little to do. Moſt of the *Glands* in the *Fœtus* are vaſtly large in proportion to the other Parts, and have all their Receptacles full. The *Stomach* and *Guts* are full, but have emitted nothing. I preſume likewiſe, that the *lymphatick Syſtem*, the *Lacteals*, *Receptacle of the Chyle*, and *thoracick Duct*, are pretty much in the ſame Condition; all full and ready to diſcharge themſelves.

In this State the *Fœtus*, which till now has been hanging as a ſucking Wen on the Mother, like ripe Fruit is ſhaken off, and muſt ſubſiſt by itſelf. Nature has furniſhed it with a Variety of different Organs, for receiving Nouriſhment, for tranſmitting, perfecting and applying it. All this Machinery, moſt of which has hitherto in great meaſure been at reſt, is ready to play off,

off, when the Creature is thruſt into the open Air.

What follows? In a few Moments it begins to gaſp and pant, (which when I firſt ſaw, I was childiſh enough to imagine it was juſt dying, when it was only beginning to breathe), the Cheſt heaves, the Diaphragm preſſes down, the Lungs fill with Air, the *Thorax* is diſtended, and the Belly is ſqueezed. Immediately afterward, the abdominal Muſcles contracting, return the Force impreſſed on them; and, by their Reaction, the Cavity of the Breaſt is ſtraitened, and the Air driven out in Infant-cries. Then, and not till then, I allow it to be *a perfect Animal.*

Some of the Effects of theſe early Motions are ſoon viſible; and it is reaſonable to ſuppoſe, that many more of them happen, tho' they are out of Sight. We ſee the Stomach and Inteſtines begin to diſcharge their Loads; and ſometimes the Urine ſtreams forth, as the Child is carrying from the Mother, before it is either waſhed, or the umbilical Cord is tied. And I imagine, that by the Liftings, Pantings and Heavings of the new-born Creature, not only the Blood takes its new Courſe through the Lungs, but that the glandular and lymphatic Syſtems are let looſe, the chyliferous Veſſels and *Pecquet*'s Duct are fully opened; their Contents ruſh through the ſubclavian Vein into the Ciſtern above mentioned, a new Mixture and a new Circulation commences. As a Counterpoiſe to theſe, the external Air may be a Sort of Equilibrium; and to this Reciprocation the *Animal Proceſs*, and Continuation of *Animal Life*, may be owing. As in the *Fire-engine*, the Steam of the Boiler on one Part,

and

and the cooling the Cylinder and Weight of the Atmoſphere on the other, act alternately, and make the Work go while the Materials keep in Order.

To what has been ſaid, I have only a little to add about the *End of this Proceſs*, or *Death*. It is generally taught, that the Life of thoſe Animals which we call *perfect*, conſiſts in a *continued Flux and Reflux of Blood, nervous Juice and Air, to and from the principal Organs*; and that (Death being a Ceſſation of theſe) a Man may be reckoned *dead* when he no longer breathes, and his Heart and Arteries have left off all Circulation and Pulſation. Even *Lanciſi*, who has wrote beſt on this Subject, in his Book *de ſubit. mort. p.* 74. ſays, That *without a ſmall Degree of Reſpiration, and ſome little Motion or Trembling of the Heart, there is no Life.* In conſequence of this Syſtem, the general Practice is, that, as ſoon as theſe Symptoms of Life are gone, all Hopes and all Endeavours to maintain and foſter the ſmall Remains of Life, are laid aſide; and the Subject, being no longer conſidered as an *Animal*, but a *Corſe*, is deſerted, and delivered over to the Undertaker.

I cannot away with this Doctrine, and abhor the Practice built on it; being of opinion, that after the Motion of the Heart, Arteries and Lungs ceaſes, there often remains a ſmall Degree of a *vital Principle*, but ſuch a Degree as well merits Attention, the Neglect of which has had many woful Conſequences. *Moſes* ſays, *The Blood is the Life*; and I am perſuaded, that after a full Stop of all thoſe *organic Motions* on which *Life* is ſaid to depend, the Juices frequently retain ſo much

much of the *Animal Proceſs*, as, in many Inſtances, ſerves to maintain Warmth for a long time; and in others, with proper cheriſhing, might reſtore Life entirely.

Not to mention the more extraordinary Accounts, tho' ſome of them are pretty well vouched, of ſuch as have been taken up dead to all Appearance, and reſtored to Life, after being Hours, and even Days, under cold Water; every Age and Country afford Inſtances of narrow Eſcapes from the Grave, and ſurpriſing Recoveries after lying long for dead; and among ourſelves we have had ſome, who have lived Years after being actually buried. From the Number of theſe who have been preſerved by lucky Accidents, (for moſt of them owed not their Reſtoration to either Art or Care), we may conclude, that there muſt have been a far greater Number of thoſe who might have been ſaved by timely Pains and Skill, and who died a Death that cannot be thought of without Horror.

Some alledge, that ſuch as recover from theſe long Trances, as they are called, owe their Safety to their having the *Foramen ovale* open; which, ſay they, ſuperſedes the abſolute Neceſſity of Reſpiration. This I think not worth inſiſting on; becauſe in many Caſes, tho' we ſhould allow the *Foramen ovale* to be open, it does not ſolve the *Phænomenon*; for ſtill the Heart ſhould beat, and the Pulſe be felt, as in the *Fœtus*.

Such uncommon Recoveries are generally accounted for, by ſuppoſing that there remained, during the whole Time of the Appearance of Death, ſome little Motion of the Center of the Diaphragm, by which a ſmall Degree of Reſpiration,

ration, tho' imperceptible to the Spectators, was continued; and ſome little Trembling of the Heart, receiving and emitting a ſmall Portion of Blood, tho' not with a Pulſe ſtrong enough to be felt, yet ſufficient to preſerve the *Vita minima*.

Our Theory (which at leaſt is innocent, and uſeful, ſhould it be the Means of ſaving one in an Age) leads further, giving Hopes, that in Caſes where at preſent there is no Circulation, that yet it may be renewed; and that one who, from a ſurceaſing of all theſe Motions, may properly enough be ſaid to be *dead*, on Recovery of them, may as properly be ſaid to *come alive* again. It is ſhortly this.

The *Cauſe of Animal Heat*, or, if you pleaſe, the *inteſtine Motion*, (tho' I can form no diſtinct mechanic Notion of it), which had been going on proſperouſly, while the progreſſive Motion of the Fluids in the Veſſels continued, is now, by the Circulation's being at a ſtand, checked; yet ſtill ſubſiſts, or proceeds in a lower Manner, perhaps like the Beginning of Fermentation or Putrefaction. By this remaining Degree of the *Animal Proceſs*, the Maſs of Fluids, particularly in the great Reſervoir of venous Blood, *&c.* before mentioned, rarefying, preſſing every way, and being reſiſted by the Valves, ſwells ſo as to fill the flaccid right Auricle of the Heart, which had been ſome time empty; and thus ſtimulating its Fibres, which were at reſt, ſets them a-moving again; (as we ſee the Heart, after being taken out of the Body, by being pricked, or having warm Water thrown on it, beats afreſh, tho' it has been for ſome time motionleſs). The right Auricle being thus filled, and ſtimulated

into

into a Contraction, fills the Ventricle; which being irritated, likewiſe contracts, and empties itſelf into the pulmonary Artery; whereby the Circulation begins where it left of, and Life is reſtored, if the Organs and Juices are in a fit Diſpoſition for it, as they are perhaps much oftner than is imagined.

This Theory will ſeem probable to one who knows, that in Death, firſt the left Ventricle loſes its Motion, and then its Auricle; afterward the right Ventricle, and laſt of all, the right Auricle ceaſes to move; eſpecially if he reflects on what *Harvey* further obſerves, *viz.* That, after all theſe are at reſt, there remains in the Blood itſelf, before the right Auricle, a certain *trepidating*, *palpitating*, *undulatory Motion*, like that of fermenting Liquors. Now, it ſeems agreeable to Nature, that this *obſcure inteſtine Motion or Ebullition*, which he obſerves after the Heart and its *Appendices* are at reſt, and which I take to be the ſame with that *intromoventis naturæ energia*, by which *Lanciſi* ſays ſome have been reſtored to Life, without either Pains or Art; it ſeems agreeable, I ſay, to Nature, that this Motion and Energy ſhould be accompanied with ſome Degree of Rarefaction; the unavoidable Effect of which is to preſs upon, and ſtimulate, the right *Sinus venoſus* and Auricle, while it inſinuates Liquor into them. And this ſeems to be all that is neceſſary to recommence the intermitted Circulation.

How long our Fluids may retain a Fitneſs for this Rarefaction, before it exerts itſelf fully, and how long our Solids may continue ſuſceptible of a new *Stimulus*, is hard to ſay, but is well worth inquiring

inquiring into. Theſe may depend on the preceeding Diſpoſition of the Blood, Temperature of the ambient Medium, Treatment, and many other Things which I have not thought of. That in ſome they may continue a long Time, and the Body not ſpoil, may be inferred from other Proceſſes; ſuch as *Fermentation*, where we ſee *Muſt* continue a long Time in a cloſe Caſk, ere it gives any Sign of Rarefaction; till at length, the Proceſs riſing to a Height, it diſplays itſelf in burſting the containing Veſſel. It might be inferred from the Inaptneſs of ſome animal Juices to freeze, in a Degree of Cold far below the freezing Point; and from human Blood continuing fluid in the Veſſels many Days after Life is gone. Authors and Nature would ſeverally ſupply me with Arguments to render this Way of thinking more feaſible; but I ſhall drop them all, and conclude this Article, about the *End of the Proceſs*, by declaring my Opinion, that Death does not inevitably attend an entire organic Reſt of what we call the Solids of the Body; nay, that one cannot be ſaid to be *dead*, till the Energy of the Blood is ſo far gone, that, tho' aſſiſted by all poſſible means, it can never be able again to fill, and ſtimulate into Contraction, the right *Sinus venoſus* and Auricle of the Heart.

To relieve the Reader from this diſmal Subject, if the Nature of this Undertaking permitted, I might carry him through the wide Circle of *Life*; we might take a View of Plants, as well as Animals, with the various kinds of Lives of both, their different Degrees and different States, with their Changes of State, ſometimes advancing,

advancing, ſometimes retrograde; and, while we purſued the ſeveral Analogies with Pleaſure, might peradventure ſtrike new Light into theſe dark Matters. I ſhall indulge myſelf in one Contemplation only, and beſtow a few Words on it, as a Specimen of what has been entertaining to me; and hope I ſhall be forgiven a ſhort Digreſſion, if that can be called ſo, which promiſes to render ſomewhat more familiar to us the uncommon Ideas which we have advanced, in conſidering the *Fœtus* and *Animal* States, as well as that of *Death*. I chiefly fix on that Period, or *Pauſe* ſhall I call it, in the Life of ſome Animals, which goes by the Name of the *benummed State*. This I do not remember to have ſeen treated to any purpoſe; and to me it ſeems curious enough, eſpecially when the Analogy betwixt it and ſome Vegetables is conſidered.

Many Plants, after taking Plenty of Nouriſhment by their Roots, bearing Leaves, (which the moſt ingenious Dr. *Hales* has ſhewn to be a ſort of Lungs to them), and breathing freely, for a Seaſon, having a vigorous Circulation and Perſpiration of their own Kinds, procreating their Like, *&c.* after all theſe, on the Approach of Winter, they ceaſe gradually from all theſe Functions, breathe no more, take no more Nouriſhment, ſeem to die, and continue dead to Appearance, till the vernal Sun revives them, diſpoſes their Juices to new Motion, renews all their Functions again, gives them freſh Nouriſhment by the Roots, new Circulation through the Stem, new breathing through the Leaves, and reſtores them to their priſtine Vigour; rejoicing us with a little annual Emblem of the Reſurrection.

This carries a pretty near Reſemblance to what happens annually to Bears, Marmotes, Dormice, Bats, Hedgehogs, Swallows, and other Animals called *Sleepers*. In the Winter, they do not feed, they have no ſenſible Evacuations, they breathe little or none, moſt of their *Viſcera* ceaſe from their Functions. Some of theſe Creatures ſeem to be dead, and others to return to a State in ſeveral things like unto that of the *Fœtus* before Birth. In this Condition they continue, till, by Length of Time maturating the Proceſs, or by new Heat, the Fluids are attenuated, the Solids ſtimulated, and the Functions begin where they left off.

To aſſiſt us in diſcovering ſomething of the Nature of this retrograde Change, into a State where there remain few Traces of animal Life, and even little or no *Circulation* or *Reſpiration*, and in many Particulars very much reſembling our own Deaths, I ſhall point out three obvious Things, which have the moſt ſenſible Influence on the two laſt named Functions; theſe are, *Diet*, *Exerciſe*, and *Air*.

As to the *firſt*; every one's Experience tells him, that he has a higher and quicker Pulſe, as well as a more frequent and larger Reſpiration, after feeding; and, *cæteris paribus*, in proportion to the Quantities of new Chyle which enter the Blood. On the other hand, after long faſting, the Pulſe is lower and ſlower; and the Lungs have ſo little Play, that the Reſpiration is hardly to be ſeen, if there is no other ſtimulating Cauſe acting at the ſame time.

Secondly, *Muſcular Motion* quickens the *Circulation of the Blood*, and that in proportion to the Vehemence

Vehemence of it. Lying quiet, in an easy Posture, where fewest Muscles are employed, the Pulse is slowest; sitting, it rises a little; standing and walking, yet more and more; and running raises a Fever for the Time. I need not repeat the same Things of *Respiration*, which is influenced pretty much in the same Way, in proportion to the Number of Muscles acting, and the Violence of their Contractions.

Thirdly, These Functions depend much on the Temperature of the Atmosphere we live in. In a *hot Air*, our Inspirations are more full and frequent, and our Blood swelling, circulates with more Violence. In a *cold Air*, *cæteris paribus*, we breathe much seldomer, and with less Distension of the Chest; and, the Blood subsiding, the Circulation is calmer.

If we take a full View of the Influence which these three have on the most important animal Functions, and such as are most subject to our Senses, I think we have a Clue to lead us a good Way into the Nature of this Change of State: For, since we find in ourselves, that most of our Functions, and particularly the *Circulation* and *Respiration*, are increased by *Diet*, *Heat*, and *Exercise*; and that, in proportion to the Diminution of these three, the other two are lessened, it seems no hard Matter to conceive, what happens to the *Sleepers*; and that there may be still greater Effects of a Concurrence of these three in such Animals, (whose Juices perhaps differ from ours, especially at certain Seasons, being fitted by Nature to their Necessities); and that a Creature, receiving no new Chyle at all, making no *Locomotion*, and being in a cold Place, in a cold Sea-

ſon, may ſubſiſt without *Reſpiration*, and perhaps with little or no *Circulation*, and return either to a State, in many things reſembling that of a *Fœtus*, or to one a-kin to that of the Vegetables above mentioned in Winter; or near to that of a man who ſeems dead, or is really ſo for the Time, but retains a Principle of *Reviviſcence*.

Having been carried farther than I at firſt intended, I ſhall not only drop the Application of this, which every intelligent Reader can proſecute; but, curbing both my Imagination and Reaſonings, abſtain from entering on a Number of Matters which offer themſelves, both as Arguments to prove, and Illuſtrations to clear up, theſe Opinions and Conjectures.

From what has been already ſaid, I hope I may be allowed to conclude, that, ſince it was never known, or at leaſt demonſtrated, that any Fluid acquired Heat by Agitation, Conquaſſation, or Friction with a ſolid Body, independent of any other Proceſs: Since it was never known or demonſtrated, that ſuch a Change was made on the Structure of the minute Parts of Bodies, as is made in this Proceſs, without producing Heat at the ſame Time: Since in Fermentation, Putrefaction, *&c.* the Heat is not pretended to be owing to the Veſſels containing the changed Subject, but to what happens to its minute Parts in undergoing that Change: Since theſe Things are ſo, I ſay, I may conclude, that it ſeems an unphiloſophick Partiality for the *mechanic Syſtem*, to maintain, that our Juices acquire all their Heat by the coarſe mechanic Attrition of their Particles on

one

one another, or by rubbing with the Veſſels. I ſhall end with a Conjecture propounded in theſe ſhort Queries.

Q. 1. Since there are Proceſſes, in which Mixtures will not efferveſce, without being ſhaken or ſome how moved; may not this *animal Proceſs* be ſomewhat of that kind, owing only its going on proſperouſly to the circulatory Motion, as a *conditio ſine qua non?*

Q. 2. Since there are Proceſſes, in which Mixtures maintain an Efferveſcence, while there is a conſtant Addition of ſome one or other Ingredient, to keep up the Heterogeneity of the Mixture, and when that new Infuſion ceaſes, the inteſtine Motion ceaſes alſo; may not this Proceſs be of that kind? Or,

Q. 3. May it not be a Compoſition of both kinds?

Of the hot and cold Pediluvium.

Though there are few Practices more common, than putting the Feet into warm Water; yet the Uſes of *warm Bathing* in general, and of the *Pediluvium* in particular, ſeem to be ſo little underſtood, that they are often prepoſterouſly uſed, and as injudiciouſly abſtained from. It is therefore to be wiſhed, that the Principle, on which they are practiſed were cleared up, and eſtabliſhed on a more ſolid Foundation than it has hitherto, at leaſt generally, been.

I ſhall not pretend to treat the Subject either fully, or orderly; but offer my Thoughts on it, in the Form of looſe Hints, to be digeſted and improved afterward, if more Experiments, and a

ſtricter Examination, ſhall diſcover that they deſerve it.

I have converſed with many, and wrote to others, who were reckoned no mean Philoſophers, aſking what they expected from a *warm Pediluvium*, and in what Manner it operated? and always received pretty uniform Anſwers; ſuch as, That *Fire* and *Water* are the two principal and univerſal *Relaxers:* That warm Bathing, by *relaxing* and *enlarging* the Capacities of the Veſſels, makes a *Derivation* of the Fluids into the Parts bathed, and a *Revulſion* from thoſe at a Diſtance: That, by their *relaxing* and *enlarging* the Capacities of the Veſſels of the Legs when immerſed, theſe become able to contain a greater Quantity of Blood; and conſequently a ſmaller Portion remains in the ſuperior Parts: That this Revulſion from the Head or Breaſt, when aggrieved, brings a ſudden Relief, by there being ſo much leſs Impetus on the oppreſſed Parts: That, in the Small-pox, the Danger of which is eſtimated by the Quantity of Eruption on the Face and ſuperior Parts, bathing the Limbs conduces to increaſe the Eruption on the Extremities, and diminiſh it on the Face and Breaſt.

Theſe make a plauſible Theory, and may paſs well enough in a Prelection; and, having the Appearance of being very philoſophical, cannot miſs to be greedily ſwallowed down by young People. This is of bad Conſequence. But the greateſt Misfortune is, that this Doctrine is generally believed, and founded upon in Practice, even by thoſe who have been much and long verſed in it; tho', after all, it will not, in my Opinion,

nion, ſtand the Teſt of a thorough Examination and Experiment.

That *Fire* may be reckoned a *Relaxer*, in ſome Senſe, I ſhall not diſpute; tho' I think we have very confuſed Ideas of *Relaxation* and *Conſtriction* in this Queſtion: But that the principal Effect of the hot Water *in Pediluvio*, cannot, with any Propriety, be called a *Relaxation of the Veſſels*, I am pretty poſitive; and that one might as juſtly ſay, when *Heat* is applied to a Bladder half full of Air, and the Bladder thereupon ſwells to its full Dimenſions, that the *Heat relaxes* the Bladder, when indeed it only *expands* the included Air.

There is a ſort of Philoſophy ſubſervient to Practice, which, neither beginning or ending far back, at the remote and abſtruſe Cauſes of Phænomena, (where moſt of our Reaſonings are not only hypothetical and precarious, but generally uſeleſs), reſts ſatisfied with nearer and more intelligible Cauſes; where our Judgment of the Effects is leſs liable to Miſtake: Or rather, we purſue from the Effects and Conſequences, backward to the Cauſes; but no further than theſe are uſeful, and can be well eſtabliſhed. I know not, for example, what makes Blood occupy more Space when warm than cold. I do not trouble myſelf with an Inquiry, whether this is owing to the Quantity of Air, or of a ſulphureous Principle, or of any other Thing in it. It is enough to a practical Philoſopher, to know that *Rarefaction* is the conſtant Effect of the Blood's being heated; the natural Conſequences of which, without riſing to any higher Theory, aſſiſt him in regulating his Practice.

You

You tell me, that when I put my Feet into warm Water, the Veſſels *relax*: I come in from the cold froſty Air, with my Veins appearing no bigger than Threads; and, after being ſome time by a warm Fire, when theſe ſwell to three times the Size, you tell me, that the Heat of the Fire has *relaxed* the Veſſels, and enlarged their Capacities. I can neither believe nor underſtand this Explication, which ſuppoſes the Veſſels of the heated Parts to become like larger Pumps, ſucking into themſelves a greater Proportion of Liquors than they uſed to do, and leaving leſs to be diſtributed through the reſt of the Body.

I can conceive no *Relaxation* here, but what is owing to the Rarefaction of the Blood; which, when warm, occupies a larger Space, and diſtends the Veſſels. If the Blood did not thus ſwell, the Weight of the incumbent Atmoſphere would keep the Veſſels ſtill applied to it, however ſmall its Volume was; and, if there was no Blood to diſtend them, they would collapſe, heat them as much as you will.

The two great Powers diſtending and contracting the Veins, I take to be the *contained Blood*, and the *Weight of the Atmoſphere*. The natural Elaſticity and Strength of the Coats of the Veſſels are indeed a real Force; but this ſeldom needs to be conſidered, being pretty uniformly the ſame, while the Conſtitution is not greatly changed. The moſt varying of theſe three is the Blood; which, at one Time occupying an Area vaſtly larger than at another, ſuſtains a far greater Weight of the Atmoſphere; therefore the Rarefaction of the Blood muſt ſometimes

times be very great. The following I think an Experiment that overturns the common Theory, and gives a good deal of Light into what happens by the warm *Pediluvium*.

To bring the Matter to a ſort of Demonſtration, in a cool Evening, *October* 2. before Supper, I cauſed two Youths, the one of the Age of fourteen Years, the other of thirteen, both ignorant of the Purpoſe of the Experiment, to put their Legs into warm Water; after examining the Colours of their Skins, and the Size of the Veins in their Hands and Faces; and while they continued in the *Pediluvium*, I counted their Pulſes exactly by a Watch meaſuring Seconds; and obſerved,

That, at 8 o'Clock, immediately after the Immerſion to the gartering below the Knee, in Milk-warm Water, their Pulſes beat in a Minute, the firſt 66, and the ſecond 84, as before Immerſion. At 15 Minutes after 8, the Water a ſmall Time before being increaſed in Heat, tho' not to the Degree of the Warmth of Blood, the ſecond yawned, and began to breathe quicker: Their Pulſes then beat, the firſt 69, and the ſecond 88. About 25 Minutes after 8, the Water being made full Blood-warm, the Veins of their Hands were greatly ſwelled, the ſecond had his Face fluſhed; their Pulſes beat, the firſt 75, and the ſecond 94. At 35 Minutes after 8, both of them had the Veins of their Faces and Hands very much diſtended: The firſt ſaid he was greatly diſpoſed to muſing; the ſecond was ſleepy, with his Face ſo red that I was afraid of hurting him, by purſuing the Experiment any further. Both their Pulſes, which in the Beginning were

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ſoft and ſmall, became very full and hard; and beat, the firſt 80, and the ſecond 98, in a Minute. Then I made them ſet their Feet on a ſpread Carpet, ſitting ſtill without any Motion, as they had done before, and reckoned their Pulſes; which, at 40 Minutes after 8, beat, the firſt 71, the ſecond 90; and, at 46 Minutes after 8, their Pulſes became leſs and ſofter, beating, the firſt 69, the ſecond 88. A little after 9, the Fluſh was off the ſecond's Face; and their Pulſes were become quite ſoft and ſmaller, the firſt 66, and the ſecond 85, almoſt as they ſet out.

This I take to be an *experimentum crucis* in the Matter, giving a true Explication of the Manner whereby hot bathing operates; and demonſtrating, that the Diſtenſion of the Veſſels is owing chiefly to the Rarefaction of the contained Fluids.

My Opinion of the warm *Pediluvia* then is this. The Legs becoming warmer than before, the Blood in them is warmed; this Blood rarefying, diſtends the Veſſels; and not ſtagnating, but circulating, it imparts a greater Degree of Warmth to the reſt of the Maſs; and as there is a Portion of it conſtantly paſſing through the Legs, and acquiring new Heat there, which Heat is, in the Courſe of Circulation, communicated to the reſt of the Blood, the whole Maſs rarefying, occupies a larger Space, and of conſequence circulates with greater Force. The Bulk of the whole Blood being thus increaſed, every Veſſel is diſtended, and every Part of the Body feels the Effects of it; the diſtant Parts a little later than theſe firſt heated.

In the above Experiment, not only the immerſed Parts and lower Extremities ſwelled, but the

the whole Body; and the Pulſes of the Wriſts and Temples beat fuller and quicker, as well as thoſe derived from the deſcending *Aorta*. There can be no *Revulſion* here.

If the Conſequences were not too ſerious, I could be diverted with the prepoſterous Application of the Warm *Pediluvium* in ſome Caſes; ſuch as, in Hæmorrhages of the Noſe or Lungs, Overfulneſs of the Head or Breaſt. In theſe and the like, they are uſed with Intention to draw the Blood down to the Feet, or to keep it from aſcending impetuouſly to the Head and Trunk. But, alas! the contrary to what is intended, comes frequently to paſs; the Blood heated in the Feet, increaſing the Warmth of the whole Maſs, augments the Diſeaſe.

Numberleſs Caſes are to be ſeen in very good Authors, where the Benefit obtained by it, is attributed to its making a *Derivation* into the Parts immerſed, and a *Revulſion* from thoſe affected, becauſe they are relieved; when truly the Cure is performed by the direct contrary Method of operating, *viz.* by a greater Force of Circulation through the Parts affected, removing what was ſtagnating, or moving too ſluggiſhly there.

I am of opinion, that where there is an irreſolvable Obſtruction, (though by its taking off from a *Spaſm* in general, it may ſeem to give a Moment's Eaſe), we never find the ſmalleſt Benefit by warm Bathing, or that it draws from the diſtant Parts; but that it often hurts, by puſhing againſt Matter that will not yield, with a ſtronger *Impetus* of Circulation than the ſtretched and diſeaſed Veſſels can bear, haſtening the Cataſtrophe in bad Caſes. So that, where there

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is any Suſpicion of a *Schirrhus*, I would never order a Courſe of warm Bathing of any Sort.

On the other hand, where Obſtructions are not of long ſtanding, and where the impacted Matter is not obſtinate, warm Bathing may be of great Uſe to reſolve them quickly. In recent Colds, with ſlight humoral Peripneumonies, they are frequently an immediate Cure. If this is performed by the *Pediluvium*, it is generally termed a *Revulſion* from the Breaſt; but with no more Propriety, than if one ſhould ſay, that a *Revulſion* from the Breaſt was made by a Bowl of Sack-whey, hot Punch, or the old Cure of two Bottles of Wine and a red Herring; which produce frequently the ſame Effect, and (though not ſo ſafely) by a ſimilar Operation, *viz.* increaſing the Force of the Circulation, opening the Skin, and driving freely through the Lungs that *Lentor* which ſtagnated, or moved ſlowly, in them. As thus conducing to the Reſolution of Obſtructions, they may be conſidered as ſhort and ſafe Fevers; and in uſing them we imitate Nature; which, by a Fever, often carries off an obſtructing Cauſe of a chronical Ailment.

It is common to wonder, that the Circulation of the Blood ſhould have ſo long continued a Secret: But it is as wonderful, that *Medicine* ſhould have received ſo little Improvement from this important Diſcovery. The Antients, who were ignorant of it, are excuſable for the Badneſs of their Theory of the *Pediluvia*. They knew nothing of the ready Communication of all the Parts of the Body by means of it; and, wanting our Lights, contrived their *Attractions*, *Derivations*, and *Revulſions*; of which the far greater

greater Part is either not true, or not to the Purpoſe. Yet ſuch is our fooliſh Veneration for Antiquity, that we are at great Pains to adapt the modern Diſcoveries to that *Jargon*, which Time only has made ſacred. *Harvey* performed Wonders; and thoſe who wrote ſoon after him did very well, but could not be always on their Guard, and failed of applying the Doctrine of the *Circulation* in ſome Diſquiſitions in which it might have been of Uſe. They remained ſatisfied, in treating the Subjects where the Application of it was leſs obvious, with continuing in the ſame Strain with the Antients. The ſucceeding Theoriſts, again, miſled, by ſeeing the ſame Reaſonings, which were in the beſt Authors who wrote before the great Diſcovery, continued by thoſe who wrote after it, went on in the ſame Tract. And now, that *Bellini*, *Boerhaave*, and *Hoffman*, have either not conſidered it, or not explained it fully, it is not to be wondered, that their Scholars continue in the ſame Path.

Bellini, in enumerating the Advantages of hot Bathing, and Manner of its operating, mentions the Water compreſſing by its Weight, penetrating and mixing with the Fluids, diſſolving and carrying away what is viſcid or ſtagnating, *&c.* but miſſes entirely the *Rarefaction* occaſioned by it. He names it indeed, in treating of the *Pediluvium* and *Inſeſſus*; yet appears not to have this Opinion fully, becauſe he brings in the putting one's Feet into warm Water only as a *commodum quoddam particulare*; led to it, I ſuppoſe, by its Effects on the *Uterus*, as an *abdominal Viſcus*; and ſeems not to reflect on its Actions on the ſuperior Parts.

I ſhall not mention *Boerhaave* farther, than to ſay, that I, and as many of his Scholars as I have converſed with, learned from him the Doctrine which I have been endeavouring to overturn.

As *Hoffman*'s Works are a very uſeful Treaſure of the Theory and Practice of Medicine, I ſhall take the Liberty to conſider his Opinion on this Head a little more fully. He frequently points right, by touching at the Dilatation of the Blood by Heat, when writing of the hot Bath; and likewiſe mentions it when he ſpeaks of the *Pediluvium*. But where he treats moſt expreſsly of it, he falls in preciſely with the general Opinion; particularly he has theſe Words, *Tom.* 1. *p.* 466. *Dum enim humore illo callido foventur pedes, nervoſæ, tendinoſæ, ac muſculoſæ in iis fibræ ex quibus intercurrentibus vaſis coagmentati ſunt, laxantur, remittuntur, pori & tubuli antea conſtricti ampliantur, ſanguini aditus humoribuſque debitus redditur commeatus: quo fit, ut impetus aliis partibus incumbens divertatur, ac cum inſigni levamine ad inferiora derivetur.* Here I muſt differ from him, and think he has been led into this Sentiment, purely by his Deference for the Antients, and the common Opinion. And though immediately after he points at the Truth, when it was unavoidable; yet he relapſes again, adding, *Et certe laudatiſſimi ſunt uſus ad derivationem, in morbis, qui à congeſtionibus ad caput & pectus, per ſpaſmos inferiorum maximeque hypochondriorum factis, ſubnaſcuntur; ut præter ſoporoſos affectus omnes ferè capitis morbi ſunt, &c. Narium hæmorrhagiæ nimiæ, &c. nec non quæ pectus affligunt, aſthmata*

aſthmata convulſiva, *dyſpnœæ à copia ſanguinis*, *hæmoptyſis*. Here I preſume to think him wrong, having heard of much Miſchief done by this Theory; which nothing but frequent Warnings in Practice made me examine and relinquiſh.

What he calls *taking off a Spaſm*, and *relaxing the Solids*, I grant to be of great Uſe in ſome Caſes; but imagine, that Heat diſtending the contained Fluids, preſſing againſt the *ſpaſtick* Veſſels, is for the moſt part the true Cauſe which removes Spaſms; though I do not deny, that there is ſome *agreeable Senſation*, and *undulatory Motion*, as they call it, of the whole *genus nervoſum*, that may relieve from Pain, where there is really nothing done toward the Cure; for we oft ſee the Diſeaſe return with double Force after leaving the warm Bath.

I'm in ſome Doubt about what he ſays of relaxing the rigid tenſe Fibres, conſtricted by a *Spaſm*; from this Conſideration, that many of the *Phænomena* which induce us to imagine that *Spaſms* are owing to a great Power exerted by the Solids in contracting themſelves, are really owing to a Want of Power in ſome of them to contract as they ought, and as they uſed to do. *Ex. gr.* On *Inanition*, we have frequently *Convulſions*, owing to the Want of Power in ſome *Antagoniſts*. When we ſee a violent Convulſion, we immediately think of the great Force that ſeems to be exerted; but do not reflect on the great Want of Force which is the Occaſion of it. In a Caſe of this kind, when the warm Water takes off the Spaſm, it has been thought to do it by ſoftening and relaxing the too rigid, ſtrong, pulling Parts: but I imagine it owing

rather to the filling all the Veſſels with new rarefied Fluids, and thereby reſtoring the Equilibrium; and that in this conſiſts much of the true Philoſophy of theſe *agreeable Senſations*, and *undulatory Motions* and *Vibrations* ſo much talked of.

What is juſt now ſaid may be confirmed from the common Practice of curing *Convulſions from Emptineſs*, by adminiſtring alcaline Spirits, compound Waters, and other warm Cordials; as alſo by warm Bathing of any kind; likewiſe from what happens to thoſe who are ſubject to ſome nervous Diſorders, particularly low hyſteric People, who have their Veſſels too empty, or unequally filled. They find frequent Relief from *Head-achs* by the *Pediluvium*, and obtain the ſame likewiſe by the laſt mentioned Medicines, Wine, and the reſt of that heating and rarefying Claſs. I would fain hope, therefore, that henceforth, in theſe Caſes, the Cure by hot Water may not be imagined always to operate by *Revulſion*.

It is eaſy to ſhew, that this juſtly eſteemed Author's Practice correſponds with his Theory. He uſes warm *Pediluvia* in *Hæmorrhages*, in a *ſpaſmodic Aſthma with Suſpicion of a Polypus in the Heart*, in a *Vertigo* and *Hæmoptoe*, and ſome other Caſes, where I ſhould be afraid to uſe them; and continues to preſcribe them with Encomiums, though ſome of his Correſpondents paint their bad Effects in pretty ſtrong Colours, *licet provido ſatis tepore adhiberentur*.

At the ſame time, I muſt do him Juſtice by taking notice, that, both in *Theory* and *Practice*, he comes very near the Opinion I have been endeavouring to eſtabliſh: For, in his Theory of hot

hot Bathing, he is ſo clear about the *Expanſion of the Blood*, and *ſwelling of the Body*, that it is ſurpriſing he ſhould omit them in other Parts of his Works, where the Conſideration of them ſeems of great Importance. And, in his Practice, though he extols them by ſuch Expreſſions as theſe,—*ferè divinæ ſunt virtutis pediluvia*;—*præſtantem vim, humores à pectore derivandi poſſident*;—*ad revellendum ſanguinis ad inferiora motum, egregium ſpondent uſum*,—and the like; yet he frequently cautions againſt their being too hot: And, if this was carefully attended to, there would little Hurt be done by them; becauſe the cooler the Water, the Effects of it are the nearer to a *Revulſion*, and quite cold Water for the moſt part makes one.

The only Thing in which I eſſentially differ from him is in maintaining, that the *warm Pediluvium* never makes a *Revulſion* from the ſuperior Parts, when it procures what he calls a *Relaxation*, and I a *Diſtenſion*, of the Veſſels; and that the more the Veſſels of the Legs *ſwell*, or, as he ſays, are *relaxed*, the greater is the Force of the Circulation every where very ſoon after.

One Paſſage more from this Author will ſhew how near he comes to the Truth, and at the ſame time give a notable Inſtance how obvious Truth may be, and yet paſs unobſerved, when there is a powerful Prejudice againſt it. *Tom.* VI. *p.* 84. diſcourſing of the Effects of *Opium*, he ſays, *Capitiluvia, pediluvia, balnea ad ſomnum blandum diſponere, in foro medico notiſſimum, quod tamen non alia ratione fit, quàm quod expanſionem ipſis humoribus inducant, unde etiam habitum corporis*

turgidulum atque inflatum reddunt. This Obſervation is juſt, and hitherto the Reaſoning good; the natural Inference from which ſeems to be, That ſince theſe warm Baths make all the Humors expand, and the whole Body ſwell, they likewiſe procure a greater Flow of warm rarefied Blood through the Head, and thereby diſpoſe to ſleep. But the preconceived Opinion, and the Doctrine of *Revulſion*, is ſo ſtrong, that he concludes, *Sicque lentiùs ſuccedit ſanguinis motus per caput, & placidiùs ſubſequitur ſomnus*; as if Sleep could not be induced by filling the Head with a greater Quantity of Blood; which has frequently that Effect: For, that the *ſanguinis motus per caput* does not ſucceed *lentiùs*, after a large Doſe of *Wine*, *Opium*, *warm Bathing*, or other expanding Cauſe, may not only be inferred from the Laws of the Circulation, which make it neceſſary, when the Blood is expanded, and the Heart throws out a greater Volume of it, that the *carotid* and *vertebral* Arteries have their Proportion; but is plain to Experience, from the Redneſs of the Face, and Tumidneſs of the Jugulars, which return the Blood from the Head.

That the common Opinion has prevailed in *Britain*, as well as elſewhere, cannot be more plainly made out, than from a little Manual, that has been long in every body's Hands: I mean, *Fuller's Pharmacopœia extemporanea.* He recommends ſitting half an Hour in his *lotio pedalis* made very hot (*calentiſſima facta*) in burning Fevers, where the boiling Blood attacking the Head, overheats the Brain, kindles the Spirits, driving them to Diſtraction, Rage, *&c.*; and this he does in order to ſolicit the Motion of the Blood downward,

cool,

cool, and quiet it. His Theory is the ſame with the reſt; for he ſays, *Sciendum enim eſt primo, in corpore noſtro, duos plane diſtinctos eſſe ſanguinis magnos, & provinciales circulos; unum nempe per arteriam aſcendentem, in partes ſupra, (*or *ſitas); atque alterum per deſcendentem, in ſubter ſitas. Secundo, Quò rapidiùs, & pleniori fluento, ſanguis in inferiorem provinciam irruit; eò placidiùs, & minori rivo in oppoſitam ſuperiorem influere neceſſe eſſe; & é contra. Atque hoc fundamento nititur rationalis doctrina de revulſione univerſali.* Thus have we been generally miſled by what he calls the rational Doctrine of Revulſion; which, ſince it has ſo bad a *Foundation to lean upon*, muſt fall to the Ground.

The intelligent Reader will no doubt, from ſcattered Sentences of the Authors I have mentioned, and others, diſcover a Foundation for moſt of what I have ſaid; but muſt at the ſame time ſee, that their Notions have never been able to determine the Current of Reaſoning and Practice, either in themſelves or others, into a right Channel; otherwiſe I ſhould not have owed my preſent Way of Thinking to Experience, but to my Books and Maſters.

Near thirty Years ago, a Reverend Divine, in a Fever with a Head-ach, without any Dilirium, or other threatning Symptom, had his Legs put into hot Water. At firſt he ſaid it was very agreeable; then he ſpoke much; and in half an Hour became quite dilirious, and continued ſo till next Day, that he died. This was imputed to a too ſtrong *Revulſion*, which had not left that Force of Circulation through the Head which was neceſſary to maintain the Functions: But it

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is more probable, that his Death was owing to a greater *Impetus* on the Brain than it could bear. This was the firſt Caſe which ſtumbled me at the Doctrine I had imbibed in the Schools. I met with others in a ſhort time, which appeared very ſtrange to me; ſuch as, a wiſe and ſober Matron's putting her Feet into warm Water, being attended with a Delirium, as if ſhe had drunk Champaign to Exceſs; a young Nobleman, after going into a warm Bath, ſinging and raving at firſt like one drunk, and a little after raging like one quite mad: Both recovered as ſoon as they became quite cool. After this I uſed the warm *Pediluvium*, and carefully examined the Effects of it on myſelf, and experienced an agreeable *Reverie*, and Diſpoſition to ſleep, the common Effects of Wine with me. Then I begun to ſuſpect that it acted chiefly by rarefying the Blood, and deriving more to the Head, oppoſite to the common Opinion; and ſoon afterward became convinced of it by numberleſs Inſtances.

Since that Time I uſed the warm *Pediluvium*, when rightly tempered, as a ſafe Cordial, by which the Circulation can be rouſed, or a gentle Fever raiſed; with this Advantage over other Cordials and Sudorificks, that I can take off the Effect of it when I pleaſe, and that it operates without throwing into the Blood any heating Drugs, which cannot be ſo eaſily diſcharged out of the Body.

Though I reckon the Rarefaction of the Blood, however neglected, to be the moſt important Conſideration, when we preſcribe this Method of Cure; yet I am far from believing it to be the only one. And perhaps it will be expected I

ſhould

ſhould ſay ſomething of the reſt; which however I ſhall paſs over very ſlightly, being pretty fully treated by *Galen*; whoſe Reaſoning upon them, with very little Alteration, has continued down to this Day.

Opening the Pores by ſoftning and relaxing the Skin, Humectation of the Body by Water imbibed, taking off a Spaſm, and eaſing Pain; theſe, with Revulſion from diſtant Parts, ſeem to be the chief Topicks inſiſted on. To the laſt of theſe I need ſay nothing further.

No doubt, Bathing ſoftens and relaxes the Skin; which may be of conſiderable Uſe in clearing the Pores, and forwarding the Perſpiration of the immerſed Parts: But this cannot be of great Conſequence, when the Legs only are bathed; for their Surface bears only a ſmall Proportion to the reſt of the Body. And, in the Small-pox, where ſo much is expected from it, I think the frequently tumultuous Operations of it renders it ſuſpected, and at beſt of very doubtful Effect: At leaſt, the univerſal Practice of it, familiar with ſome, is empyrick and bad, as all univerſal Practices are, not making Allowance for the Difference of Caſes. I much prefer *Monſ. Martin* of *Luſanne's* Method of bathing the Skin, not only of the Legs, but of the Face and whole Body, with a ſoft Cloth dipped in warm Water, every four Hours, till the Eruption: By this means, the Puſtles may become univerſally higher, and conſequently more ſafe.

As to the Humectation of the Body by Water mixing with the Blood, it may be in Part true; but there is much more imputed to it than it deſerves. To this is attributed the ſwelling and increaſed

increased Fulness of the Body in general, which we have shewn to be owing to another Cause, *viz.* the Rarefaction and Attenuation of the Blood; which may be produced almost as readily by Heat without Moisture: For warm Bottles applied to the Feet, putting them into hot Sand; the Fumes of Spirit of Wine; Bladders full of hot Water, or the Heat of a dry Bagnio, do the same Thing as effectually as Immersion into warm Water. Nay further, I doubt whether the Body, in a Pediluvium, imbibes more than it loses; considering that the *emitting* or *perspiring* Vessels are dilated, as well as the *admitting* ones, however bibulous our Imaginations are apt to make them; and that there is now a greater Force of Circulation driving outward, enough to overbalance the additional Weight of Water; which I purposely omitted in enumerating the Effects of this Method of Cure, because it seemed inconsiderable when the Legs only were bathed. Some of the Phænomena that seem to favour the *Dilution* of the Blood, by a Quantity of Water imbibed through the Skin, such as the running of the Nose, and Drought being quenched, may very well be accounted for in another Way: For the increased *Impetus* of the *rarefied* and *attenuated* Blood, making a more forcible Circulation through the *Schneiderian Membrane*, and *salival Glands*, may thin and increase the Quantity of *Mucus* and *Saliva*; whereby the Nose runs, and the Drought is quenched.

Having already treated of the warm Bath *taking off Spasms*, and *easing Pains*, as far as these depended on *warming* and *rarefying* the Mass of Blood; what I am further to add on this Head,

† Query will not y^e body weigh more after bathing y^m before? would not y^e Steam of hot water penetrate more into y^e blood & mix with it, than y^e water by immersion.

relates

relates as well to the *cold Pediluvium* as the *warm*, and indeed admits Application to many other Things. Baths of both kinds ſeem to have an immediate Influence on the whole *nervous Syſtem*; which we can but ill explain, or little underſtand, being ignorant of the Conſtruction of the Organs of *Senſe* and *Motion*, and able to make only very imperfect Gueſſes about the Theory of *Senſation*, *muſcular Motion*, and the mutual Influences of *Soul* and *Body*.

In violent Pains, hot and cold Bathing, as well as a great many other Things, produce the ſame Effects, and in the ſame Way in one reſpect, *viz.* aſſwaging the Pain, by taking off the Attention from it. When one is much pained, withdrawing the Action of the Nerves correſponding to the affected Part, employing many Nerves, or ſome of them violently another Way, will ſeldom fail of giving Eaſe. *Muſick* has ſo great Power to aſſwage the Pains both of Body and Mind, as to have given Riſe to the Fable of *Orpheus*'s charming for a while the infernal Torments. Strange amuſing Stories will take off almoſt any Pain for a little. Sudden News, whether good or bad, Surprizes or Affronts, not only remove the Hiccup, but greater Pains. The Tooth-ach has been cured inſtantly by a Threatening of a Box on the Ear, or pretending an Attack upon a Lady's Honour. One Pain is commonly a Cure for another. Applying Garlick to a diſtant Part, Burning and Bliſtering, cure all in this Way.

In examining carefully the Effects of the warm *Pediluvium* tried on myſelf, I ſometimes obſerve them to tally to thoſe of *Muſick*, and imagine

gine the *Pediluvium* operates much in the ſame Manner; though I do not know whether Muſick acts by exciting an agreeable *Vibration* of the whole *nervous Syſtem*, in conſort with the Nerves of the Ear; or by concentering the Attention of the Mind, and the Employment of the *Senſorium commune*, to the Sounds. In *Bathing*, the infinite Number of ſmall *nervous Papillæ* ending in the Skin, and eſpecially the more ſenſible ones of the Feet and Hands, deſigned for the delicate Senſe of *touching*, being tickled; and putting the whole *Genus nervoſum* in conſort with them, into a delightful undulatory Motion; the Soul attends to this new agreeable Feeling, and finds a ſweet Avocation from the former Torment. Much the ſame happens in *cold Bathing*; not indeed as the Senſations are *pleaſant*, but as they are *lively* and *ſtrong*, and thereby have the ſame Effect, diverting the Attention from the preceeding Pain, and employing the Soul, as a *ſentient Being*, another Way.

Thus far the *hot* and *cold Pediluvium* have the ſame Effects; in other Reſpects they differ widely and have generally quite contrary ones. Theſe I leave an intelligent Reader to make out, from the Principles ſcattered through what is already ſaid; and, inſtead of treating the *cold Pediluvium* directly, I ſhall give a few Hiſtories, from which the Doctrine may in part be gathered.

The firſt ſhall be that of a notable Caſe, which probably would have been fatal without the Practice of the *cold Pediluvium*, and which gave Riſe to thoſe that follow.

A Gentleman of twenty ſeven Years of Age, who ſeemed to have nothing amiſs in his Conſtitution,

tution, and naturally not coſtive, from catching Cold, as he imagined, *July* 7. 1739, began to complain of a ſlight Pain of his Breaſt, Stomach and Guts, and to be uneaſy from Coſtiveneſs. As every body has a *Noſtrum* for ſuch Complaints, when not exceſſive, he tried ſeveral Cures of his own; but, growing daily worſe,

On the 10th he called Dr. *Young*, who that Day, and the 11th, adminiſtred *lenitive* and purging Clyſters, *laxative Ptiſans*, Solutions of Manna and of Salts, Boluſes and Pills of different Strengths and Kinds.

The 11th at Night I was called, and found him rendering his Clyſters as they were injected, without any *Fæces*, vomiting every thing taken by the Mouth, reſtleſs, and greatly pained from the Navel to the *Os pubis*, with a low Pulſe. We tried that Night to ſtop the Vomiting, by Doſes of Salt of Wormwood with Juice of Limon, and to open his Body by *Tinctura ſacra*.

In the Morning of the 12th we were told, that he had thrown up all his Medicines ſoon after they were taken, and had continued to vomit every Thing he had drank through the Night. He had no Sleep, and was crying out with the Violence of the Pain of his lower Belly. His Pulſe being a little fuller, and more frequent, he was bleeded plentifully. To ſtay the Vomiting, which was firſt of all neceſſary, and without which nothing could be done to purpoſe, we gave him, every half-hour, two Spoonfuls of a ſtrong Tincture of dry Mint in good ſimple Mint-water. This ſettled his Stomach, as it ſeldom fails to do. Our next Deſign was to pro-

cure him Paſſage downward; which we durſt not attempt by a full Doſe of any Purgative, leſt, by the Irritation, the Vomiting might be provoked anew: We propoſed therefore to melt down what obſtructed the Gut, by giving every Hour one Pill of equal Parts of Soap and Aloes, with two Spoonfuls of the Tincture of Mint, to prevent his throwing them up. This Day he took ten Pills; had Fomentations and Clyſters repeated; was in a warm Bath, and had a Lamb's Skin hot from the Animal applied to his Belly; but all in vain: The Conſtipation of the Bowels continued obſtinate, the *Hypogaſtrium* became ſwelled and hard, and his Pain almoſt beyond human Sufferance.

The 13th he continued without Sleep, or a Moment's Eaſe, ſweating frequently, and crying out with the inceſſant Torment of his Guts. He continued the Soap and Aloes Pills every Hour, till he had taken twenty three, all which he retained; as likewiſe a Solution of Manna in Whey; but nothing paſſed. In the Afternoon Dr. *Clerk* was called. He was again let blood, and got Clyſters of a Decoction of Prunes, with four Spoonfuls of ſweet Oil added. At Night he ſwallowed a Bolus of ſweet Mercury, three Hours after which he threw up every Thing he had taken; and his Caſe was looked on as deſperate, the Fever increaſing, and the Agony intolerable. This Day we talked of trying Quickſilver, or the Bellows. The *cold Pediluvium* was alſo propoſed, but put off.

On the 14th, after he had paſſed a miſerable Night, without Sleep, in the moſt extreme Pain, when there appeared no Hopes from any of the common

common Methods, I renewed the Propoſal of the *cold Water*, and advanced ſuch Arguments for it, as made the Gentleman eager to try it; and it was agreed to.

He was carried into a cold Room with his Limbs naked. Every ſecond Minute a Porringer of cold Water was daſhed on him, beginning at his Feet, and riſing gradually, till, toward the End of the Operation, it was thrown as high as the *Pubis*. We made him ſometimes walk about, ſometimes ſtand on the cold wet Floor, and frequently plunge his Feet alternately in a Tub of cold Water. He found ſoon that it gave him Strength, and was rather comfortable than diſagreeable, for near half an Hour. Then he began to cry out as before, vomited once, was fatigued, and complained bitterly of his Belly being more ſwelled than ever, and of very ſharp Gripes. Immediately after this, at the End of 35 Minutes, he purged on the Floor before he could be got to the Stool; where he had a large liquid Evacuation, with ſome little indurated *Fæces*. He went to Bed much relieved; but ſtill uneaſy with the Soreneſs of the Parts, and the Remainder of ſo great a Load. In the Afternoon he got an emollient Clyſter, along with which he evacuated ſome hard Excrement. At eight in the Evening, we gave him a Doſe of *Tinctura ſacra*, and thirty Gutts of *liquid Laudanum*. About Midnight he purged a great deal; a conſiderable Share of which was indurated Stuff.

On the 15th, we found the Opiate had procured him ſome Sleep. He had four Stools before we ſaw him in the Morning. The ſtrained and

ſore Part of the Gut continued uneaſy, and his Fever ſtill pretty high; but his Belly was become quite ſoft. He continued to take Pills of *Soap* two Parts, and *Aloes* one, for ſome Hours. At laſt, after having been full ſix Days without one Grain of Food, he got every now and then two Spoonfuls of Chicken-broth, or one of *Panado*, and drank a little Sack-whey, or Cows Whey, till the Evening, when his Drink was changed to *Arabick* Emulſion, by turns, with Barley-water ſweetened with Syrup of Violets. He paſſed a good Night without any Anodyne, and had three or four Motions preceeded by ſharp Gripes.

The 16th, in the Morning, he was leſs feveriſh and much eaſier. The ſame Food and Drinks were continued through the Day. He had two or three Stools with Gripes, which were ſucceeded by a good Night's Reſt.

In the Morning of the 17th, he had one very copious Diſcharge, in which there were hard *Fæces* of the old Remains. After this he became quite eaſy, his Fever going off, as it does commonly the third Day after the Body is opened.

Before I give the Reaſons inducing me to propoſe, and the Gentleman to ſubmit to ſo uncommon a Practice, I ſhall tell what made me firſt think of it.

One, who was no Phyſician, having read in a looſe Leaf of ſome old Book, that an obſtinate Conſtipation had been removed by throwing cold Water on the Feet, put it in practice in *Holland* on an Acquaintance of his and mine, in a Caſe of that Kind which had proved obſtinate to all Dr. *Boerhaave*'s Applications for ſeveral Days. I was at ſome Pains in ſearch of the Author of this

this Hint; but could find nothing like it, ſave the Account that *Braſſavolus* gives of *Savanarola*'s curing the Duke of *Ferrara* of a three Days Conſtipation, by making him walk bare-footed on a cold wet Marble Floor.

Though *Braſſavolus* counts this a dangerous Remedy, and not to be tried, becauſe it may bring on Gripes and a Flux; and however ridiculous the Experiment may at firſt Sight ſeem to be, I thought it ſo reaſonable, and conſonant to ſound Theory, that I ſtill kept it in my Eye, as well worth trying, when other Means of opening the Body failed; perhaps in the *Iliac Paſſion* itſelf. The *Rationale*, at leaſt the Feaſibleneſs of this Cure, will, I hope, appear, from reflecting on theſe few looſe Hints; the Application of moſt of which is ſo obvious, that I ſhall hardly need to make it.

There is nothing more common than Colick Pains and Purging, from cold wet Feet. *Cutis ſiccitas alvi laxitas*, is a well known Aphoriſm. On a ſudden Check of the Perſpiration, the perſpirable Matter frequently makes a Puſh at the Guts, and brings on a *Diarrhœa*: This ſeems to have an Advantage which neither Purgatives taken by the Mouth, nor Clyſters have, or can have; for either of theſe can act only on one End of the hard Excrement with which the Gut is in a Manner corked; whereas the Matter of the *Sanctorian Perſpiration*, checked by external Cold, ruſhing into the Cavity of the Inteſtine, betwixt it and the *Fæces*, may, at once, lubricate the Paſſage, diſſolve Part of the hard Contents, and ſtimulate the Gut to forward the Egeſtion. In the Small-pox, and other Fevers,

when there has been a long Retention of Urine, Patients commonly get Relief immediately after ſetting their Feet on the cold Ground. As cooling the Feet forwards both the Secretion and Excretion of Urine, it may have a ſimilar Effect on the Bile. Moſt People incline to make Water, and many are diſpoſed to go to Stool, on putting their Feet into cold Water, or even waſhing their Hands with it; from a Sort of Tremor, Shock, or Stimulus induced on the Nerves; taking off ſome *Inertia* or Sluggiſhneſs of the membranous Syſtem of the Guts and Bladder, which had diſabled them from throwing off their Loads. From what I have obſerved, on opening the Bodies of ſome who have died of *Conſtipation*, and the *Ileus* itſelf, I am apt to believe, that frequently theſe Ailments are, firſt or laſt, owing to, or attended with, a kind of *Palſy* of the Inteſtines; to be cured by fomenting the *Abdomen* with Wine in which Aromaticks have been boiled, and drinking a little of the ſame when the Pulſe is ſlow and the Body cool; or in this Way by the cold Water, when the Patient inclines to be hot or feveriſh. By putting the Feet into cold Water, the whole Body is cooled; and the Blood, chilled by this Operation, occupying a leſs Space in the Coats of the Inteſtines, may allow of an eaſier Secretion into their Cavities: And if a conſiderable Quantity of Air in the Guts conduces to the Diſeaſe, by this Coldneſs it may be more condenſed; and the Inteſtine, hitherto ſtrained by its Rarefaction, now contracting, may be better able to perform its Office. The cold Bath is the beſt Cure of that Difficulty of making Water which is cauſed by a too long Retention

Retention of Urine. Immerſion in cold Water was uſed by the Antients in *ardent Fevers*; and it has been practiſed, even in this cold Climate, without any bad Conſequences; particularly by an hardy Empiric on his Mother, a Lady well ſtricken in Years, with notable Succeſs: So that there was leſs Room for Objections to this Practice in the preſent Caſe, where the Patient was young and ſtrong, and the Fever ſymptomatick; eſpecially when the Diſeaſe ſeemed deſperate without it.

I ſhall add nothing further, by way of Apology for this Method; and leave the Reader to chuſe for himſelf, which of the Conjectures, thrown together in the preceeding Paragraph, to impute the Cure to. It may be owing to a Combination of ſome of them, or perhaps to others, which the ingenious may think of, and I have omitted.

The next Hiſtory is that of a very extraordinary Diſeaſe; which does not find a Place here, on account of any Affinity betwixt it and the preceeding, but becauſe the ſurpriſing Efficacy of the ſame Application in opening the Body appears in it. It was tranſmitted to me by my Friend Dr. *Pringle*, (then Phyſician to the *Britiſh* Army, and now alſo to his Royal Highneſs the Duke of *Cumberland*), who had adviſed Mr. *Catherwood*, Surgeon to *Onſlow*'s Regiment, to make the Experiment. The following is a Copy of his Letter to the Doctor.

" One *Laurence*, a Soldier in Brigadeer-Ge-
" neral *Onſlow*'s Regiment, after a ſlight Inter-
" mittent, which was carried off by a Vomit
" and a few Bitters, was ſeized with an obſti-
" nate

" nate *Conſtipation*, which laſted, in ſpite of all
" the Means I poſſibly could think of, from the
" 27th of *September* to the 8th of *November*
" following, before a Stool could be procured;
" which at laſt was obtained by the following
" Experiment. On the 8th of *November*, about
" Noon, a Clyſter of Water-gruel, with two
" Ounces of ſoft Soap, was firſt injected: In a
" Quarter of an Hour after, I ordered him to
" be taken out of Bed, ſtripped mid-thigh, and
" to be led about the Room by two of his Fel-
" low-ſoldiers. At which Time I daſhed his
" Legs and Thighs every half Minute with cold
" Spring-water; which I found ſurpriſed him
" much, and ſeemed to give ſenſible Shocks to
" the whole Habit. About the tenth Minute
" from the firſt Sprinkling he began to drop
" ſome Excrement; at the ſeventeenth Minute,
" a pretty tolerable Stool came away, rather a
" ſoft than a hard one; which ſurpriſed me the
" more, as he had been ſo long without one.
" Finding him at this Time weak, and fatigued
" with walking ſo much about, I ordered him
" to be wiped dry, put to Bed, and a Porringer
" of warm Broth to be given, and covered up
" cloſe. He continued in this Way till ten o'
" Clock at Night; at which Time he had ano-
" ther Stool, which was ſucceeded by two more
" involuntary ones before Morning; the whole
" making a pretty conſiderable Evacuation. It
" muſt be obſerved, that through the whole of
" this Caſe the Patient had no Complaint of
" Pain, no vomiting, but an extraordinary groſs
" Evacuation by Urine of a chocolate Colour.
" Sometimes he would take his Nouriſhment
" pretty

" pretty well, at other times obſtinately refuſe " it. All along he ſeemed to be ſtupid; and is " at this Time ſo emaciated and weak, that, " without ſome extraordinary Turn, I muſt " think him ſtill incurable. If you can think " of any thing that may be of further Service in " this Caſe, I ſhall, with Pleaſure, obſerve your " Commands, being, *&c.*"

Bruges, Nov. 11. 1742. W. CATHERWOOD.

N. B. *He is about* 45 *Years of Age.*

A third Caſe comes from the ingenious Dr. *Middleton* at *Briſtol*; who, upon being deſired by my Friend Dr. *Gilchriſt* at *Dumfries*, communicated it with the Frankneſs of a Gentleman, and a Lover of Phyſic.

A Gentleman, twenty eight Years of Age, of a ſcorbutic Habit, but otherwiſe not unhealthy, going out a-ſhooting, *Tueſday* the 20th *November* 1744, a cold froſty Morning, came home weary, and not well. Next Day, being quite coſtive, he took an Ounce Tincture of Rhubarb, by Advice of a Surgeon; which, having no Effect, was repeated the 22d; and continuing on the 23d without a Stool, a Clyſter was given, which came off without any Relief. By this Time he was greatly oppreſſed, and in Pain, throwing up every thing that he eat or drank; and about Midnight was in extreme Pain in his Bowels, like pricking of Pins acroſs the Belly. In this Condition he lay when I was called to him, *Saturday* Morning the 24th. He breathed freely, his Pulſe was but low, and not very quick. However, I choſe to have him loſe ſome Blood, and ſtaid to ſee ſeven Ounces taken from him.

him. And, to aſſwage the Pain and Spaſms in his Bowels, and ſettle the Stomach, I ordered the following Mixture. ℞. *Aq. lact. alexiter. menth. a.* Unc. i. ſem. *theriacal.* Unc. ſem. *ſyr. è mecon.* Unc. i. *laud. liq. Sydenh.* Gutt. lxxx. *m. cap. coch.* i. *omni ſemihorâ, donec inceperit leniri dolor.* And, at the ſame time, the following Embrocation was applied: ℞. *Ung ſambuc.* Unc. i. *ol. chem. lavend. puleg. a.* Gutt. x. *ſp. ſal. armoniac.* Gutt. l. *m. f. linimentum, abdominis regioni, leni frictione manûs calidæ, applicandum; ſuperimponendo pannum laneum molliſſ. calidum.* When the Pain was ſomewhat eaſier, and the Stomach ſettled, the following purging Apozem was given. ℞. *Senn. opt.* Unc. ſem. *rhei el.* Drach. ii. *mann. opt.* Unc. ii. *m. & affunde aq. font. fervent.* Unc. x. *f. infuſ. vaſe clauſo per ſemihoram colat. add. elix. ſalut. tinct. rhabarb. cum vin. a.* Unc. i. *m. cap. coch.* iv. *tertiâ quâque horâ, donec inceperit operatio per ſedem.* His Pain was not ſo violent that Night; and what he took ſtaid with him. But the 25th, in the Morning, the Vomiting returned; on which the Infuſion of *Fol. menth. ſicc.* Unc. i. *cum aq. menth. bullient.* lb. i. was given *cochleatim, in vomitu vel nauſea*; which ſettled the Stomach. And now ſuſpecting the Conſtipation would be obſtinate and lingering, I choſe ſoon to give Quickſilver in the following Manner. ℞. *Hydrargyr. puriſſ. per corium traject.* lb. ſem. *divid. in* iv. *part. æq. quarum cap.* i. *tertiâ quâque horâ.* Towards Night he began to take the following Pills. ℞. *Sapon. Caſtil. aloes opt. a.* Drach. i. *ſyr. balſ. q. s. ut f. pill. med. quarum cap.* iii. *ſecundâ quâque horâ.* Another half

Pound

Pound Quickſilver was ordered to be given in the ſame Manner as before; the Embrocation was again applied to the Belly, and the following anodyne Draught was ordered. ℞. *Pill. math* Gr. vi. *diſſolv. in aq. menth.* Unc. i. *ſyr. è mecon.* Unc. ſem. *m. hauſt. horâ undecimâ veſp. ſumend.*

The 26th in the Morning, the *Nauſea* and Vomiting returning, were kept within Bounds by the *infuſ. menthæ cochleatim calid. exhibit.*; the Embrocation was repeated, which always aſſwaged a little the Anxieties and extreme Pains in the Bowels. The purging Apozem was repeated with the Addition of *ſal. mirab. Glauber* Unc. i. and given *coch.* iv. *quartâ quâque horâ.* About Noon the following Clyſter was given. ℞. *Dec. commun. pro clyſter.* Unc. x. *ol. commun. ſacch. rubr. a.* Unc. ii. *ol. chem. aniſ.* Drach. ſem. *ſal. mirab. Glauber.* Unc. i. *m. f. enem.* This came off preſently without any Effect. About three Afternoon a Clyſter of Tobacco-ſmoak was largely inflated into the Inteſtines. This gave conſiderable Eaſe, and came off with ſome windy Exploſions; but no *Fæces* followed. In the Evening the Tobacco-ſmoak was again injected, with much the ſame Effect; but no Excretion of *Fæces.* The *hauſt. paregoric. ult. præſcr. cum addit. pill. math.* Gr. iii. was repeated, *horâ octavâ veſp. ſumend.* And the following Plaiſter was applied over the Belly. ℞. *Empl. ex galban. crocat. è cymin. a.* Drach. vi. *camphoræ tantillo olei ſolut.* Drach. ſem. *m. & extend. ad alutam, ut f. empl. abdominis regioni calid. applicand.* All this Time, though often in great Anxiety and Pain, he was ſeldom very feveriſh; his Pulſe rather low and flutter-

ing,

ing, as in hyſteric Caſes, and ſometimes pretty calm; but often with great Lowneſs of Spirits and fainty Sweats, which continued more or leſs this Night with little or no Sleep.

In the Morning of the 27th, being exceedingly fatigued, low, and fainty, a little warm Wine was given, and a Cordial of *aq. lact. alexiter.* Some *aq. theriacal.* and *Sp. C. C.* was ordered for him to have recourſe to *in animæ ſubſidentia.* The purging Infuſion was continued, and about three in the Afternoon the Clyſter of Tobacco-ſmoak was repeated, with much the ſame Effect as before. The Pains now returning, with ſinking Lowneſs, and fainty clammy Sweats; I doubted the Symptoms would precipitate, and ſoon finiſh the Cataſtrophe: Wherefore, thus prepared, I determined to try the cold *Pediluvium*, in hopes by it to ſnatch and ſave him from the Jaws of imminent Deſtruction.

A Tub of Water was brought into his Bed-chamber, which was a very large Room, and the Weather cold and froſty. Between five and ſix he was taken out of Bed in his Waiſtcoat and Night-gown; the Gown tucked up, and the Legs and Thighs quite bare. Then a Pint-bowl of Water was daſhed upon his Feet; and walking the Length of the Room, another Bowlful was thrown in the ſame Manner when he returned: And thus walking and returning, every Time the Water was thrown a little higher, till coming up Mid-leg, he put firſt one Leg and then the other in the Tub, and ſo walked and returned on the cold wet Floor. By this Time his Faintneſs left him, growing tolerably eaſy, and pretty ſtrong. On every Walk to the End

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of the Room, and Return to the Tub, he had a new Daſh of Water, riſing ſtill higher, till it came near the *Os pubis*. Sometimes he complained of Gripes, but had long Intervals of Eaſe. In about half an Hour he had ſmart Stings of griping, which I expected to be the Forerunner of a Stool; but was baulked, and mortified to find no Diſcharge, tho' I kept him moving and bathing fifty Minutes; when being weary and cold, but not in Pain, I put him to Bed. I ſat by him till after ſeven o'Clock, and ordered the paregoric Draught to be repeated, in caſe his Pain returned. His Faintneſs and Sickneſs did not return after bathing; but he had often very ſharp Pains, and, ſoon after eleven o'Clock, was ſo lucky to have a very plentiful Stool, with a good deal of Wind; and, before ſeven in the Morning, had ten more Stools, being in perfect Eaſe in his Bowels.

When I viſited in the Morning, *November* 28. there was no Fever nor Pain remaining; only a ſort of Wearineſs and Soreneſs of the Fleſh all over him, as if he had been well threſhed with a Cudgel; ſuch as often happens to Women after hyſteric Paroxyſms. His Appetite returned at once, being hungry, and eating Panada with a good Reliſh, when I came to him. It is remarkable alſo, that no Quickſilver appeared in his Stools (tho' he had two or three more that Day) till the 29th, riding out by my Direction, to ſhake a little in a Coach, on his Return home, the Quickſilver came off, the whole Pound at once, with ſome indurated *Fæces*.

Briſtol, College Green, *Auguſt* 26. 1745, from Dr. *Middleton*, to Dr. *Gilchriſt* at *Dumfries*.

Other Hiſtories, akin to theſe, might be added; and many more be brought, to prove, that the external Uſe of cold Water, and the *Pediluvium* in particular, when adminiſtred with Judgment, and in proper Caſes, may have more good Effects than are commonly known, beſide opening the Body. I ſhall end with one of this kind.

All that is needful to relate of it is, that, on the 27th of *September* 1739, a Lady complained a little once and again of a Pain low in the right Side of her Belly, and vomited ſometimes; but continued to go about till the 29th at Night, when ſhe was ſeized with a ſharp Pain of the left Side of the *Hypogaſtrium*, Shivering, and Vomiting; but paſſed the Night without great Complaint.

In the Morning of the 30th, ſhe became much worſe, vomiting every thing, tormented with the Violence of the Pain, very feveriſh, with an inſatiable Thirſt. In this miſerable way ſhe paſſed that whole Day and the following Night, without one Moment's Sleep or Eaſe.

October 1. ſhe was ſtill worſe: For, in the Evening, to the above Symptoms were added a great Difficulty of Breathing, and Rattling of the Throat, ſo that ſhe deſpaired of herſelf, and was deſpaired of by all about her; the Night bringing no Relief.

Being well attended by Dr. *Lowis*, Preſident of the College, Dr. *Lermont* and Dr. *Glen*, ſhe was judiciouſly treated with early and repeated Bloodings, Clyſters, Stomachics, Laxatives, Anodynes, *&c.* without any laſting Abatement of the Symptoms. She went into a warm Bath on the 30th, which, like a Charm, ſuſpended, for a little, the Pain; but it ſoon returned with Violence.

Violence. A ſecond Bath in the Evening of *October* 1. gave not a Moment's Eaſe, and ſeemed to bring on the ſuffocating Difficulty of Breathing.

The Suſpicion of an *Iliac Paſſion*, and the known Succeſs of the cold *Pediluvium* in the recent Caſe of the Gentleman whoſe Hiſtory I gave firſt, induced them to aſk my Opinion.

On the 2d of *October*, I found her in great Agony from the Pain in her left *Hypogaſtrium*, throwing up every thing in leſs than half an Hour after it was taken down, breathing quick, lying cloſe on her left Side, with her Body bending forward, and her Limbs drawn up, without being able to ſtir out of that Poſture, or ſuffer herſelf to be turned or moved a-bed; the leaſt Motion increaſing her Torment.

Being aſked what was to be done, ſince ſhe could not be moved? I propoſed that cold Water ſhould be tried to her Hands, and that as this gave her Eaſe and Strength, we might proceed. Immediately a Veſſel of cold Water was brought, and her Hands put into it. At firſt ſhe ſighed, then fetched larger Cheſtfuls of Air: In a few Minutes, ſhe not only breathed ſlower, but ſaid the Water was comfortable, and that ſhe found herſelf eaſier, and thought ſhe could move: Soon after ſhe raiſed herſelf, and turned to the other Side; and by and by wanted to get out of Bed, and try the Water to her Feet. We agreed to her making a ſhort Trial of it, and retired.

She was led about, and had cold Water flung on her Feet and Legs. The Noiſe of Mirth from the Ladies within ſoon brought us to the

Door. We begged her to deſiſt, becauſe of her extreme Weakneſs: She would not, ſaying it gave her Spirits; and not only Strength and Eaſe, but Pleaſure: So that ſhe was hardly perſuaded to return to Bed at the End of half an Hour.

The moſt notable Effects were, That though the Experiment was made at Noon, and ſhe had no Stool till Midnight, (not having been much more coſtive than her ordinary); yet, from the Moment ſhe touched the cold Water with her Hands, ſhe never once vomited, her Sickneſs and Pain abated, and ſhe ſoon got Strength and Courage to turn, riſe, walk about, and endure, or rather rejoice in, the Pediluvium.

Before I conclude, I muſt beg the Reader to make Allowances for the Manner in which theſe haſty Thoughts have been thrown together; written at very different Times, and in different Tempers: One while, though diſſatisfied with the commonly received Doctrine, yet fluctuating and uncertain as to a better; at another Time, when the Arguments appeared ſtronger, eſpouſing as my own, what I had formerly ſeemed ſceptical about.

Studying Brevity, I have, no doubt, left ſome Parts obſcure; and more liable to Objections than if they had been treated in a more diffuſe Way. Perhaps I ſhould have mentioned various kinds of *Fermentations* and *Putrefactions*, *cool* and *hot*; and particularly ſhewn an infinite Difference betwixt the Rotting of dead Bodies, or the Corruption of vegetable and animal Juices in open Air, and that *hot Putrefaction* betwixt which

which and the *animal Process* I have traced a pretty near Analogy. Perhaps I have pursued the Analogy too far, and should have set forth the many Circumstances in which they differ. Indeed I could almost wish that, to avoid Cavil, I had insisted less on *Putrefaction*, and continued to call the *animal Process* only an *Effervescens sui generis*; or begged of the Reader, as I did of the Gentlemen of the *Philosophical Society*, when the first Draught of this Paper was read before them, that I might be indulged in designing this *Process* by some unknown Term, such as Z; leaving to the most ingenious Dr. *Hales*, and to the Disciples of *Newton* and *Homberg*, to investigate its Nature, and give it a proper Name.

I have kept back a good many Things that have a near Connexion with these Subjects; and also a Number of *Corollaries*, both *theorical* and *practical*; some of which seem to be of no small Moment: They would have taken up too much Room in this Volume: Possibly they may appear in another Work; and perhaps with greater Advantage, after the Opinion of the *Publick* is known. Having endeavoured to lay together a few Materials for a *Physiology* more according to Nature, explode some Errors, set some Practices on a better Foundation, and introduce something new into Practice, as also thrown out some Conjectures for further Examination; I wait, with great Docility, the Judgment of the Learned, before I venture to infer from them all that I imagine may be drawn.

LXXVIII. *An Account of the moſt remarkable* Improvements *and* Diſcoveries *in Phyſick made or propoſed ſince the Beginning of the Year* 1735.

DR. *Martin* (in one of his *phyſical and medical Eſſays*) has made uſeful Remarks on the Conſtruction and Graduation of Thermometers; and has reduced the moſt remarkable of theſe Inſtruments, which have been employed in different Parts of *Europe*, for obſerving the Changes in our Atmoſphere, to one general Standard, ſo as to enable us to compare all theſe Obſervations together.

Mr. *Macky*, Profeſſor of Hiſtory in the Univerſity of *Edinburgh*, ſent the Royal Society a Voucher for the *Grandgor (Lues venerea)* raging at *Edinburgh* in 1497. It is a Royal Proclamation, ordering all who had the Diſeaſe, or who had attended People under it, to repair forthwith to an Iſland in the *Firth of Forth*. *Philoſoph. Tranſact.* Num. 469. § 5.

Dr. *Hahn*'s Treatiſe on the Antiquity of the Small-pox, mentioned by us, *Vol.* 2. *p.* 323. has been criticized by Dr. *Werlhoff*; who endeavours to ſhew, that Dr. *Hahn*'s Quotations from the old *Greek* Writers, concerning the *Carbuncle*, cannot be underſtood of the *Small-pox*; which is a Diſeaſe we have no Account of till the *Saracens* diſperſed it.

Dr. *Hahn*, in a Letter on the *Cyrtonoſus*, or Rickets, which is commonly thought to be a modern Diſeaſe, quotes *Hippocrates*, and ſeveral other antient Writers, as treating of it.

Mr. *William Arrot* Surgeon, who lived a conſiderable

ſiderable Time in *Peru*, deſcribes the Tree from which the famous *Peruvian Bark* is got. It grows in the Country between two and five Degrees of South Latitude. It is tall, without Branches to near the Top, where it ſpreads out into a Hemiſphere. Its Bark is of a dark Colour on the Outſide. Its Leaves reſemble thoſe of a Plum-tree. There are four Sorts of the *Bark*; the reddiſh, the yellowiſh, the curling, and the whitiſh. The two firſt are the beſt Kinds. The curled is got from young Trees; and the white ſoon becomes inſipid. The beſt Sort grows about the City of *Loxa*. The *Indians* ſlice off the Bark from the Trees in the Woods, and it is immediately carried down to the Farm-houſes in the low Ground, to be dried. *Philoſoph. Tranſact.* Num. 446. § 1. See alſo Mr. *Condamines*'s Account of this Tree in *Memoires de l'Acad. des Sciences* 1738; who ſays, this Tree is called *Caſcarila*, and is very different from the *Quina Quina*.

The *Italian* Phyſicians ſeem at preſent very fond of *cold Water*; which they eſteem almoſt an univerſal Remedy, giving in the Day 15, 20, or 25 Pounds of Water made cold by Ice, and applying at the ſame Time cold Water or Snow to ſeveral Parts of the Body. By this Method they treat Fevers, Small-pox, Dropſy, *&c. Commerc. Norimb.* 1736. *Hebd.* 8. § 2.

Near the famous Well at *Pyrmont* is a Stone-quarry under Ground; in ſome Parts of which a ſulphureous Steam comes out, which riſes a ſmall Height for ordinary. Animals held in this Steam are ſoon ſuffocated, but recover if quickly taken out. When one ſtands in this Steam, with the Head higher than it aſcends, it proves

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an excellent Sudorific. Dr. *Seip* propoſes to perform Cures in ſeveral Diſeaſes with it. *Philoſoph. Tranſact.* Num. 448. § 4. and *Miſcellan. Berolinenſ.* Tom. 5. Part. 2. § 4.

Mr. *Tennent* (in his Letter concerning the *Seneca Rattle-ſnake Root*) tells us, That being informed of the Efficacy of this *Polygala Virginiana, foliis oblongis, floribus in thyrſo candidis, radice Alexipharmaca*, in preventing the terrible Effects of the Bite of the *Rattle-ſnake*; and having ſeen People thus bit under Cure, by taking this Root internally, and applying it externally, he ſuſpected, from the Analogy of the Symptoms with thoſe of a Pleuriſy, Peripneumony, and other Diſeaſes ariſing from a Viſcidity and Coagulation of the Blood, that it might alſo be ſerviceable in thoſe Diſeaſes. Having afterwards made trial of it in ſuch Caſes, it anſwered ſo well, that he gave it to a conſiderable Number of ſuch Patients; ſeveral of whoſe Caſes he relates.

This *Seneca Rattle-ſnake Root* has a faint Reſemblance to the Rattle of the Snake for whoſe Bite it was firſt employed by the *Indians*. Upon firſt ſwallowing the Powder of this Root, one does not think it very pungent, but ſoon after it diſcovers itſelf to be very acrid.

Mr. *Tennent* gives this Medicine either in Powder or Decoction; but prefers the Decoction, having obſerved it to give Relief ſooner than the Powder does. The Doſe of the Powder is 35 Grains; and he gives at once three Spoonfuls of the Decoction, prepared by boiling three Ounces of bruiſed Root in a Quart (two Pounds) of Water, to near the half. The Doſe is repeated every ſix Hours. Its Effects are diuretic diaphoretic,

diaphoretic, cathartic, and ſometimes emetic. He prevents the two latter Operations, by mixing any teſtaceous Medicines with the Powder, and giving it in weak Cinnamon-water.

When it is a genuine inflammatory *Pleuriſy*, he lets Blood in the Beginning; and repeats it afterwards, if there is Occaſion. But, if either the Diſeaſe is of the nervous or baſtard kind, or has been of ſome ſtanding, he forbears Bloodletting, Veſicatories, and all other Medicines, truſting entirely to *this Root*; which he affirms has ſcarce ever failed to make a Cure, and that in ſome very deſperate Circumſtances.

Mr. *Tennent*, not only recommends the *Seneca Rattle-ſnake Root* in theſe more acute Diſeaſes, but is alſo fond of it in the Rheumatiſm, Dropſy, and Gout; in which laſt Diſeaſe, he ſays, he has given it with Succeſs.

Meſſ. *Lemery*, *Du Hamel*, and *Du Juſſieu*, vouch for the good Effects of the *Seneca Root* in Pleuriſies, and other inflammatory Diſeaſes. *Memoires de l'Acad. des Sciences*, 1739.

Mr. *Du Hamel* found the *Polygala vulgaris* of Service in promoting Expectoration in Pleuriſies. *Memoires de l'Acad. des Sciences*, 1739.

Jo. Jac. Zannichelli (in a Letter *de Hippocaſtani facultatibus*) affirms, that, after a great many Trials, he has found the Bark of the *Hippocaſtanum* to have the ſame Effect as the *Peruvian Bark* has.

The Powder of *Cortices Aurantiorum* ſometimes cures quartan Agues. *Commerc. Norimb.* 1735, *Hebd.* 11. § 3.

Dr. *Kramer* recommends the Powder of the Root of the *Gratiola Centaurioides*, *C. B. Pin.*

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flore albo, as having the Effect of *Ipecacuan* in Diarrhœæ and Dyſenteries. He alſo ſays, it cures intermitting Fevers; and is preferable in Decoction to the *Woods*, in the Cure of the *Lues venerea*. *Commerc. Norimb.* 1738, *Hebd.* 3. § 1.

Dr. *Flemyng* (in his *Propoſals for the Improvement of Medicine by Phyſicians propoſing whatever they think uſeful to be examined and canvaſſed by others*) propoſes a Query concerning giving the *Jeſuits Bark* in the *Small-pox*, and recommends the Practice; which, in his Preface, he ſays he is glad to ſee has been practiſed by Mr. *Monro*. See *Art.* X. *Vol.* V.

We have an Account of many fatal Conſequences from the prepoſterous Uſe of the *Peruvian Bark*, *Select. Medic. Francofurt. Tom.* I. *Vol.* 4. *Art.* 2. confirmed by particular Examples, *Ibid. Vol.* 6. § 2.

Dr. *Bruckner* recommends the Decoction of *Arnica vera* or *Plavienſis* in feveriſh Diſorders accompanied with *Hemorrhagies*, *Efflorescentiæ*, &c. *Select. Medic. Francofurt. Tom.* I. *Vol.* 3. *Art.* 4.

The Powder of the Leaves of *Hedera arborea* is recommended by Dr. *Nebelius*, as a Specific which ſeldom fails to cure the *Paidatrophia*, or waſting of Children. The Doſe is as much as lies on the Points of two or three Knives, according to the Age, given in Tea, or ſuch like Liquor, for nine Mornings, in the Decreaſe of the Moon. *Acta Medico-phyſic. Acad. naturæ curioſorum. Vol.* 5. *Obſ.* 120.

Mr. *Godfrey* affirms, that moſt of what is commonly ſold for *Bole-armoniac*, *Terra Sigillata* and *Terra Lemnia*, is *Pipe-clay* and *Oaker* grinded together. *Miſcellan. verò utilia*, *p.* 50.

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The reſinous Part of *Opium* being noxious in Mr. *Godfrey*'s Opinion, he propoſes to make *liquid Laudanum*, by digeſting an Ounce and a Quarter of *Opium* in half a Pint of diſtilled Water twenty four Hours, ſhaking the Veſſel frequently; then filtres it, and adds three Ounces of Spirit of Wine; after which the other Ingredients may be added at Pleaſure. *Ibid. p.* 59.

Dr. *Wagner* (in his *clinical Obſervations*) recommends the Powder of *Squills*, given with *Nitre*, in hydropical Swellings and *Nephritis*; and mentions ſeveral Examples of Cures which he performed, by giving Patients four or ten Grains, with a double Quantity of *Nitre*. He ſays it almoſt always operates as a Diuretic, ſometimes vomits or purges.

Dr. *Heſs* ſays, he has made Cures of the *Aſthma* with the Powder of Squills. *Commerc. Norimb.* 1737. *Hebd.* 14. § 2. and *Hebd.* 15. § 2. The Efficacy of this Powder of *Squills*, from four to twelve Grains, in curing the *Aſthma*, is atteſted by ſeveral. *Commerc. Norimb.* 1739, *Hebd.* 34.

Dr. *Trew*, obſerving the Oil of *Cajeput* to reſemble the Smell of *Cardomoms*; and having procured ſome Cods, in which Grains were contained, from which an Oil reſembling that of *Cajeput* was got, he judges the Plant from which it is obtained to be the *Elegans Milleguettæ ſpecies*, deſcribed by *Lobelius*, or the *Granis Paradyſi ſive Mellegetæ affinis fructus*, *C. B. in Pin. Commerc. Norimb.* 1737, *Hebd.* 17. § 2.

Dr. *Trew* recommends four or five Drops of this Oil of *Cajeput* in a proper Liquor, as an excellent nervous Medicine, *Commerc. Norimb.* 1732.

1732. *Hebd.* 2. & *ibid.* 1737, *Hebd.* 24. § 2. and as of great Efficacy in the *Cardialgia*, *ibid.* 1734. *Hebd.* 5. § 1.

Dr. *Kramer* ſays *Pulv. Bufonum*, when applied by way of Poultice, with Barley-flour and Urine, is an excellent Remedy for ripening *Peſtilential Buboes*; but that it has no ſuch Effect in *venereal*, or any other than peſtilential Buboes. *Commerc. Norimb.* 1735, *Hebd.* 38. § 1.

A Viper-catcher allowed himſelf to be bit ſeveral times by Vipers; which made his Arm ſwell, brought Pains in ſeveral Parts, cauſed him to vomit and purge, and occaſioned ſeveral other bad Symptoms; which were all removed, by rubbing the Parts affected with *Sallad Oil* over warm Coals. The *Sallad Oil* proved alſo a Cure to ſeveral Animals bit by Vipers; but others died, though it was applied. *Philoſop. Tranſact.* Num. 443. § 5. 6. Num 444. § 7. Num. 445. § 6.

Meſſ. *Geoffry* and *Hunauld*, being commiſſioned by the *Academy of Sciences*, to examine into the Virue of *Oil of Olives*, in the Cure of the Bites of Vipers, conclude, from a great many Experiments made on Fowls and Quadrupeds, and from ſome Hiſtories of Men bit by Vipers, that nothing can be affirmed for the ſpecific Virtue of the *Oil* in this Caſe; for that ſeveral Animals recovered after they were bit by Vipers, to whom no Oil was applied, and others died, for whom the Oil was employed according to the Directions of the *Engliſh* Viper-catchers. *Memoires de l'Acad. des Sciences*, 1737.

Drinking Sea-water, with ſome Wine, is ſaid to prevent People from being ſick at Sea. *Act. Phyſico-*

Phyſico-medic. Acad. natur. curioſ. Vol. 5. *Obſ.* 84.

Mr. *Sutton* propoſes to clear Ships of foul Air by a Pipe; Branches of which are laid in the Hold, Well, and other Places of the Ship, where there is ſtagnating Air, and its Extremity is fixed into the Aſh-hole of the Furnace where the Kettle for preparing the Food is boiled; the Fire-hole and Aſh-hole being cloſe ſhut up by Iron-doors, as ſoon as the Fire is kindled, there muſt be a conſtant ſtrong Draught of the Air from the different Places where the Branches open. *Philoſ. Tranſact.* Num. 462. § 12. And Mr. *Watſon*, after mentioning the Advantages of this Invention, ſhews how theſe Pipes may be laid, ſo as to be no way inconvenient; and relates the Succeſs of a Trial of them that was made on a Hulk. *Ibid.* Num. 463. § 4.

Dr. *Stephen Hales* (in his *Philoſophical Experiments*) ſhews how to have freſh wholeſome Water from Sea-water, which had hitherto been attempted in vain. His Method is, to keep Sea-water cloſe ſhut up, till it has putrified, and has again become ſweet, which all Water does; then he diſtills the Sea-water; and finds the diſtilled Water, when three fourths only of the Sea-water are diſtilled, to be free both of the *Bittern* and *Acid*. He likewiſe enters into a particular Detail of the Stowage, Fuel, Diſtilling, quick Corruption, and other Circumſtances which may make the Practice of this Supply of freſh Water more eaſy.

To preſerve Water from corrupting, he propoſes that two or three Drops of *Oil of Sulphur* ſhould be mixed with an *Engliſh* Quart of Water; which may be drank ſafely.

To preſerve Ship-biſcuit from Inſects, he adviſes to make the Fumes of burning Brimſtone to paſs through the Caſks full of Bread.

He propoſes alſo to ſalt the Fleſhes put a-ſhipboard, by injecting hydroſtatically a ſtrong Brine into the Blood-veſſels of Animals immediately after they are killed.

Steel-waters often break the Bottles into which they are put; and many of them loſe their chalybeat Properties ſoon when bottled. To prevent the former Inconvenience, Dr. *Hales* put a ſmall Glaſs-tube through the Cork of the Bottles, filling them ſo as to leave no Air-bubbles between the Cork and Water. Into other Bottles he put ſome very ſoft compreſſible Corks. By both theſe means the Water was allowed to rarefy, without burſting the Bottles.——By mixing very few Drops of an Acid, ſuch as *Ol. Sulphur. Sp.* or *Ol. Vitrioli*, with the Steel-waters, they retain long their chalybeat Property.—Dr. *Juryn* found the chalybeat Waters thus acidulated, to be a very ſucceſsful Remedy for a *Diabetes*.

Dr. *Hales*'s Amanuenſis has ſtrangely altered a Quotation which the Doctor makes, *p.* 147. from our *Vol.* III. *p.* 43.

Camphire is purified by diſſolving it in Spirit of Wine, and then diſtilling away the Spirit from it, the *Camphire* being afterwards melted in Glaſſes, is formed into Cakes of the Form of the Glaſſes. *Acta Acad. natur. curioſ. Vol.* 5. *Obſ.* 98.

Dr. *Martin* (in one of his *Eſſays phyſical and medical)* endeavours to defend the Doctrine of the Antients concerning the ſpecific Operations of cathartic Medicines, againſt thoſe Moderns who alledge, that their Differences only depend on

on the greater or leſſer *Stimulus* which the ſeveral kinds of Purgatives have: He does this from the different Nature of the Drugs, and by an Appeal to Experience.

Several Attempts have been made to diſcover the Compoſition of the Remedy which we mentioned (*Vol.* III. *p.* 309.) to have had a great Run at *London*.

The Author of one Pamphlet, (*Ward's Pill diſſected*), ſays, That if one of *Ward*'s Pills, and one compounded of *Glaſs of Antimony* and *Cinabar of Antimony*, amaſſed with *Gum Tragacanth*, are put into different Places on a red hot Iron, you will ſee each of them emit a fine blue Flame with ſome Smoak, which laſts till the *Sulphur* and *Quickſilver* be both entirely conſumed; and there will remain upon the Iron in each Place the *Stibium* or *Glaſs of Antimony*, as plain and apparent as when it was firſt made; from which he concludes them to be the ſame Compoſition.

Mr. *Clutton* (in his *true and candid Relation of the good and bad Effects of Ward's Pill and Drop*) mentions ſome Caſes where they did Service; but relates the Hiſtories of fifty Caſes in which they did great Miſchief, and accuſes Mr. *Ward* of unfair Methods of obtaining falſe Teſtimonies of Cures performed by his Medicines.

From the Effects of theſe Medicines, Mr. *Clutton* judged them to be compoſed of *Arſenick*, and ſome of the violent Preparations of *Antimony*. To diſcover this, he diſſolved the ſeveral ſorts of *Ward*'s Pills, the blue, red, and purple in Water; and then viewing with a Microſcope the Powder which precipitated, he ſaw three different coloured Powders remaining of the blue

Pill, to wit, a yellow, red, and white Powder; the yellow and red agreed exactly with the *Glaſs of Antimony*, the white one appeared to be *common Arſenick*. Having put the waſhed Powder on a red hot Bar of Iron, it melted, and then evaporated away, the Smoak of it ſtinking very offenſively of Leeks, giving him a ſudden Dryneſs in his Throat, as *Arſenick* does. *Ward*'s Pill being incloſed in Copper, and expoſed to a ſtrong Heat, made the Copper white, and as hard as Iron; which *Arſenick* alſo does. Leſt the white Powder ſhould be thought to be *ſublimate Mercury*, which alſo whitens Copper, he poured *Ol. Tartar per deliquium* on it; but it did not change its Colour; whereas *Ol. Taarr* makes *Sublimate* of a fine yellow Colour. Mr. *Clutton* alſo obſerved in this blue Pill another Powder, which, by ſuch Experiments as have been mentioned, he judged to be *Zaffre*, that is *calcined Cobalt* incorporated with Flints.—As near as he could judge the Proportion of the ſeveral Ingredients in this blue Pill, are one third *Glaſs of Antimony*, near two thirds of *Arſenick*, and a very ſmall Part of *Cobalt* or *Zaffre*, with ſome Powder of *Blue*. All theſe kept together, with ſome Gum, are formed into Pills, of which ſome weigh 1 Grain and a half, others are leſs than half a Grain.

By like Experiments, the red Pill appeared to Mr. *Clutton* to be much the ſame Compoſition as the blue, only the *red Arſenick* was made uſe of inſtead of the *white*, and that the colouring of Powder *blue* was left out.

The purple Pills tinged Glaſs blue when expoſed with it to a ſtrong Heat, which *Cobalt* or *Zaffre*

Zaffre does; therefore he thinks them compoſed principally of *Cobalt*, with a little *Glaſs of Antimony*, which left a yellowiſh Border round the blue upon the Glaſs.

Mr. *Geoffroy* relates the Manner of making an Extract of Vegetables preferable to the common ones: It is by boiling a ſmall Quantity of the Drug in a large Quantity of Water; then evaporate the filtrated Decoction, to the Conſiſtence of a Syrup; which is to be poured into a Number of *China* Plates, where it is to be dried by the Heat of the Sun, or *Balneum Mariæ*. The Cruſt ſcraped off the Plates, has the ſame Virtue as the Medicine, though reduced to one third its Quantity. *Memoires de l'Acad. des Sciences*, 1738.

By mixing equal Quantities of the Juice of *Houſe-leek*, *Sedum minus*, paſſed through brown Paper, and of Spirit of Wine rectified by itſelf, a white *Coagulum* of a very volatile Nature is formed; which Dr. *Burghart* commends for curing Pimples of the Face; and ſays, that the thin Liquor ſeparated from it, with Sugar-candy, is an excellent Remedy for thick viſcid Phlegm in the Breaſt.— From the Juice of the *Sedum* coagulating with Spirit of Wine, he concludes the Juice to be of an alcaline Nature, the *Spirit of Urine* being the only other Thing he knows that coagulates with Spirit of Wine. *Satyr. Sileſiac. Spec.* 4. *Obſ.* 2.

Mr. *Maud* Chymiſt, obſerved Cryſtals formed in the *Oil of Saſſafras*, as we mentioned, *Vol.* 4. *p.* 367. Mr. *Neuman* had done in the *Oil of Thyme*. *Philoſoph. Tranſact.* Num. 450. § 7.

Mr. *Godfrey* (*Miſcellan. p.* 29.) affirms, that

the Gin commonly ſold in *London*, is made by diſtilling 30 Gallons of Water, 10 Gallons of Lamp-ſpirits, and a Quart of Oil of Turpentine.

He obſerves, (*p.* 58.), that what is called *Mercurius vitæ*, prepared of *ſublimate Mercury* and *Antimony*, has no *Mercury* in it, but is the reguline Part of the *Antimony*, with the Acid of the *Sublimate*; and what remains is the *Mercury* formed into *Cinabar*, by the *Sulphur* of the *Antimony*.

Sal Ammoniac is now diſcovered to be no other than the Salt ſublimed from the Soot of burnt Cow-dung. *Memoires de l'Acad. des Sciences*, 1735.

Mr. *Du Hamel* obſerves, that *Sal Ammoniac* mixed with the dry Powder of Chalk diſtills more eaſily, and yields a greater Quantity of volatile Salt, than by the common Methods. *Memoires de l'Acad. des Sciences*, 1735.

From the great Quantity of Sea-ſalt ſo frequently found in *Cineres Clavellati*, Dr. *Degner* ſuſpects that the Sea-ſalt is deſignedly mixed with theſe Aſhes, becauſe it is cheaper. *Act. Acad. N. C. Vol.* 5. *Obſ.* 150. See our *Vol.* 5. *Art.* 13.

It has been diſputed, whether *white Vitriol* is any thing elſe than *green Vitriol* calcined, ſeeing *green Vitriol*, when calcined, becomes white. Others obſerve, that *white Vitriol* ſtrikes only a browniſh black Colour with Galls; and that though *green Vitriol* becomes white by Calcination, yet, when it is diſſolved in Water, and again cryſtallized, it becomes green again, this Colour depending on the Water, which is no leſs than one third of its Compoſition: whereas the

the *white Vitriol* remains white after ſuch a Proceſs. Mr. *Lemery* ſhews, that the Acid contained in the different *Vitriols* is the ſame, and that more or leſs of *Allum* enters into the Compoſition of both *green* and *white Vitriol*; but in a much larger Proportion in the *white* than in any of the *green*, the *German green Vitriol* having much more *Allum* than the *Engliſh*.

Mr. *Lemery* ſhews a ſimple Method of reducing Steel to a very fine Powder, without ruſting it, as is done in the common Operations. It is this, put Filings of Steel into an unglazed earthen Veſſel, pour Water into the Veſſel, till it is three or four Inches above the Filings; ſtir it well every Day, or every other Day, ſupplying more Water as that in the Veſſel ſubſides; ſo that the Steel is always covered; continue this Operation till the Steel falls into an impalpable black Powder, then dry it for Uſe. *Memoires de l' Acad. des Sciences*, 1735, 1736.

Several remarkable Cures have been made in *Germany* by Dr. *Plummer's alterant Medicine*, deſcribed in our *Vol.* I. *Art.* VI. *Acta Acad. natur. curioſ. Vol.* 5. *Obſ.* 136.

The *Kermes Mineral* mentioned in our *Vol.* III. *p.* 348. was a Preparation of *Glauber*, which the King of *France* bought of Mr. *De la Ligerie*, and made publick in 1720; that Receipt was in the following Form. Take a Pound of *Hungarian Antimony*, broke into thin Pieces, according to the Direction of its *Spicula*, four Ounces of *Nitre* fixed by Charcoal, and a Pint of Rain-water. Boil them two Hours, then filtrate the warm Liquor; and when it cools, the *Kermes* precipitates. The ſame Antimony undergoes the

ſame

ſame Operations with the remaining Liquor, to which three Ounces of *fixed Nitre*, and a Pint of Water, are added. In a third boiling, two Ounces of *Nitre*, and a Pint of Water, are to be added to the former Lixive. The *Kermes* thus obtained is about a Drachm; and is well edulcorated by waſhing it with Water, and burning Spirit of Wine on it; then it is dried for Uſe.

Mr. *Geoffroy* ſhews, by many Experiments, that the *Kermes* is the reguline Part of the *Antimony*, joined to a ſort of *Hepar ſulphuris*; and obſerves, that more *Regulus* is diſſolved, and the Medicine is more emetic, by diminiſhing the Quantity of Water with which the *fixed Nitre* is diluted. He remarks too, that the more the reguline Particles are divided, the milder the *Kermes* is; and therefore he propoſes to rectify the *Kermes*, by putting a Drachm of well-made *Kermes* into a Matraſs, with four Pints and a half of Water, adding two Drachms and a half of *fixed Nitre* purified, by being diſſolved in Water, filtrated, and then dried. He takes notice too, that the larger the Quantity of Materials are in this Preparation, they yield a proportional larger Quantity of *Kermes*; and by repeating the boiling, even without the Addition of more Nitre, a much greater Quantity of *Kermes* may be got.

He learns us a much eaſier Way of preparing this Medicine than by the King's Receipt, which, he ſays, is practiſed by ſeveral Chymiſts. Mix intimately the fine Powder of two Parts of *Antimony*, and one of *alcalized Nitre*, or of any other fixed alkali Salt, (for he obſerves, as we did

did with Mr. *Lemery*, that any of them will ſerve as well as the *fixed Nitre)*. Melt thoſe Materials in a Crucible; then, having powdered them while hot, boil them two Hours in a large Quantity of Water; after this, paſs the hot Liquor through brown Paper, receiving it into a Veſſel where there is hot Water, the *Kermes* ſeparates when it cools. The groſſer Parts which do not paſs through the Paper, are to be boiled again, and filtrated as before for more *Kermes*; and the Operation is to be repeated a third Time, by which ſix or ſeven Drachms of *Kermes* may be got out of every Ounce of *Antimony*.

Mr. *Geoffroy* ſays, he has ſeen Effects very like to thoſe of mild *Kermes* from *Antimony*, reduced to ſuch a fine Powder, that none of the ſhining *Spicula* are to be ſeen. He likewiſe affirms, that the *Magiſtery of Antimony*, made by pouring *Sp.* of *Nitre* or *Aqua Regia* on the Powder of *Antimony*, and then edulcorating the Maſs with Water, has the ſame Effects as *Kermes*, three or four Grains of it vomiting, and one Grain acting as a Diaphoretic. *Memoires de l' Acad. des Sciences*, 1734, 1735.

Mr. *Groſs*, diſſolving thin Plates of Lead in good *Sp. of Nitre*, weakened with an equal Quantity of common Water, obſerved a grey-coloured Powder precipitate; which, when tried on Gold or Copper, ſhewed itſelf to be mercurial; and, even in the Powder, he ſaw ſmall Drops of Quickſilver. *Memoires de l' Acad. des Sciences*, 1733.

We mentioned (*Vol.* III. *p.* 345.) Mr. *Boerhaave*'s Experiments on Mercury, communicated to the *Engliſh Royal Society*, he ſent an Account

count of the other Part of theſe Experiments to the *Academy of Sciences at Paris.* The Concluſions from theſe Experiments are, That he could not change Quickſilver into any other Metal, and that no Quickſilver was to be got from Lead or Tin. *Memoires de l' Acad. des Sciences,* 1734.

Mr. *Dicterícus* propoſes to *dulcify ſublimate Mercury* more effectually than is done by the common repeated Sublimations. His Method is, to pour a large Quantity of boiling Water on it, two Pounds of Water to ten Ounces of Mercury, reduced to a very ſubtile Powder; after ſtirring them ſome time, he covers the Veſſels, and allows it to remain in reſt twelve Hours; then he pours off the Water, dries the Powder, and ſublimes it again in a Sand-heat. He ſays too, that Mercury may be had ſufficiently dulcified, by waſhing the *white Precipitate* with Water, till not the leaſt *Spicula* of Salts can be ſeen, and then ſublime it. *Commerc. Norimb.* 1737, *Hebd.* 29. § 2.

Mr. *Dicterícus* gives us theſe Rules, for knowing whether *ſublimate Mercury* is ſufficiently edulcorated in making *Mercurius dulcis.* If, after rubbing the Mercury on Gold, the Gold becomes only pale, and not white, the Mercury is dulcified enough; or, if *ſweet Mercury* becomes black when mixed with Lime-water, it is fit for Uſe; but if either the Gold becomes white, or the Mercury is of a brown or yellow Colour, after mixing with Lime-water, it is not ſufficiently dulcified. *Commerc. Norimb.* 1735, *Hebd.* 1720.

Some, inſtead of diſſolving *Quickſilver* in *Spirit*

rit of Nitre, and evaporating to Dryneſs, in order to make *corroſive ſublimate Mercury*, extinguiſh by Trituration Quickſilver in calcined Vitriol. Mr. *Lemery* obſerves, that *Bole-armoniac* or *Potters Clay* are cheaper, and extinguiſh the Mercury ſooner. He alſo agrees with *Barchuſen* and *Boulduc*, that the rubbing of *Salt of Tartar* on *corroſive Mercury*, is no Trial whether it is ſophiſticated or not; for both the Mercury that has the *Arſenick*, and that which wants it, becomes yellow, red, and at laſt black, when *Salt of Tartar* is rubbed on it. *Memoires de l' Acad. des Sciences*, 1734.

Dr. *Kirſten* affirms, that ſublimate Mercury, rightly prepared, becomes firſt Saffron-coloured, and then red, when *Oil of Tartar* is dropped on it; whereas, if it is adulterated with *Arſenick*, it becomes firſt near the Colour of Brimſtone, then red, afterwards aſhy-coloured, and at laſt black, when touched with *Oil of Tartar*. He is poſitive in this, notwithſtanding what *Barchuſen* and *Boulduc* have ſaid to the contrary. *Commerc. Norimb.* 1738, *Hebd.* 12. § 2.

An anonymous Chymiſt affirms, that *Sublimate*, prepared with *Arſenick*, becomes at laſt white, inſtead of black, when touched with *Oil of Tartar*. He ſays, that, in the Sublimation of *ſweet Mercury*, where the *corroſive Sublimate* has been adulterated, the upper Part in the Operation is of a ſulphureous or Orange Colour, and a white Earth remains in the Bottom, and the Belly of the Glaſs becomes dark-coloured or ſmoaky; whereas, when the *corroſive Mercury* is genuine, the upper Part is white, the Powder in the Bottom is red, and the Middle is not

ſmoaky-

ſmoaky-coloured. But the *ſweet Mercury*, prepared with genuine or adulterated Corroſive, appear in every Trial the ſame. *Commerc. Norimb.* 1738, *Hebd.* 37. § 1.

Dr. *Kramer* relates the Hiſtory of a Lad who ſwallowed half an Ounce of *corroſive ſublimate Mercury*; ſoon after which his Mouth, Gullet, and Stomach, were ſo eroded, that he voided large Quantities of Blood, both upwards and downwards, with violent Gripes, Fainting, Coldneſs of the Extremities, Convulſions, Cramps, Startings of the Tendons and racking Pain. A Vomit was ſoon given; notwithſtanding which, the Symptoms continuing, Dr. *Kramer* ordered mild Drink, with large Quantities of *Ol. Tartar per deliquium* in it; by which the Symptoms ſoon were mitigated; and the Cure was completed, by giving *Theriaca Andromachi*, with *Terra Sigillata*, and putting him into the warm Bath. *Commerc. Norimb.* 1735, *Hebd.* 30. § 3.

The Analogy between the animal and vegetable Kingdoms has been gradually ſhown within theſe hundred Years; but a much ſtronger Link of their Relation has been diſcovered lately, than any one we knew before. Mr. *Lewenhoek* obſerved a ſmall aquatic Animal, from the Sides of which its Young germinated (*a*); and his Obſervation was confirmed by an *Engliſh* Gentleman (*b*). Mr. *Trembley*, a young *Geneva* Gentleman, having more accurately examined this Creature, which, from its Number of ſmall Horns proceeding from its Head, he calls *Polypus*, found that there were no Males and Females among theſe Creatures; but that each

(*a*) Philoſoph. Tranſact. Num. 283. (*b*) Ibid. Num. 288.

each produced its Young, as Shoots come from Plants; only that at laſt they dropped away from the Parent.

Into how many ſoever Parts one of theſe Animals is traverſely cut, each Part becomes ſoon a compleat Creature, the Head acquiring a Body and Tail, the Tail produces a Body, Head, and Horns, and from each intermediate Part both Head and Tail ſhoot out.— When one of theſe Creatures is divided length-ways, each Half cloſes and becomes again a compleat Animal. — When the Inſide of any one is turned out, it lives, feeds, generates, and does the ſame Offices as a ſound one does; ſo that the Outſide becomes Inſide, and the Inſide changes into Outſide. Though this Creature conſiſts only of one Tube, yet its animal Nature is evident from its Motion, Senſation, and greedy devouring its Food.

Mr. *Trembley*'s Obſervations and Experiments on this ſurpriſing Creature, the *Polypus*, have been repeated and verified by ſeveral Gentlemen of the Royal Society at *London*, and Academy of Sciences at *Paris*; and ſome other Creatures of the Worm kind, *Urticæ Marinæ*, *Star-fiſh*, *&c.* have ſince been found to anſwer to ſeveral of theſe Trials. See a full Account of this Affair in *Papers read before the Royal Society, publiſhed by Dr.* Mortimer, *Philoſ. Tranſact.* Num. 466. § 2. and 5. Num. 469. § 6. *Reamur*'s Preface to his ſixth *Vol. of Hiſtory of Inſects.*

Mr. *Demour* (in his *Obſervation concernent l'hiſtoire naturelle*, tacked to his Tranſlation of our *Vol.* I. of *Eſſays*) affords us another Fact that ſerves alſo to ſhew the Relation of Animals and

Vegetables. It is in the Copulation of *Water Salamanders*; the Male of which has no *Penis*; but ſquirts out the *Semen maſculinum* at a little Diſtance from the Female: And though he could not obſerve that any of it is received into her body; yet her *Ova* are fecundated.

The *French* Academicians have of late diſputed, whether Monſters, that is, Creatures born with their Organs preternaturally formed or ſituated, ſupernumerary or defective, were originally ſo formed in their firſt *Stamina?* or, Whether this Deformity has been owing to ſome accidental Change upon them? The Arguments for theſe Opinions are Remarks on particular Hiſtories of ſuch Monſters which we cannot abridge; and therefore muſt refer to the *Memoires de l'Acad. des Sciences*, 1733, 1734, 1738, 1739.

D. *Barrere* (*Diſſert. on the phyſical Cauſe of the Colour of Negroes*) alledges, that the Gall of Negroes is black, and, being mixed with their Blood, is depoſited between their Skin and Scarf-ſkin.

Mr. *John Belchier* ſhewed to the Royal Society the Bones of Hogs; whoſe Bones were become red, by their feeding on Bran that had been boiled with printed Calicoes, which had been ſtained with Preparations of Iron, Allum, and Sugar of Lead, and had had an Infuſion of *Madder-root*, *Rubia tinctorum*, to fix the Colours, *Philoſ. Tranſact.* Num. 442. § 8. By feeding a Cock ſixteen Days on Fig-duſt, with a little *Madder-root*, all his Bones became alſo red. *Ibid.* Num. 443. § 2.

Mr. *Du Hamel du Monçau* has verified Mr. *Belchier*'s

Belchier's Experiments; and obſerved, that, except the villous Coat of the Stomach and Inteſtines, the *Capſula* of the cryſtalline and vitrous Humors of the Eyes, and ſome very hard bony Tendons, and the Bones, no other Part had any Tincture of the *Madder*. The moſt ſolid Bones were moſt tinged; and all the red ones were larger, more ſpongy, and eaſily broken; nor did they unite ſo well when broken as white Bones. Some young Animals had their Bones tinged in three Days. The red Colour went gradually off when the Creatures forbore to take the *Madder* for Food; which proved unhealthy, for they began to languiſh ſoon, and died with it.—Vegetables did not take the red Colour when they were planted in *Madder*; and none of the other Dyes which he fed Animals with, had any ſuch Effect of tinging their Bones as the *Madder* had. *Philoſ. Tranſact.* Num. 457. § 4. *Memoires de l' Acad. des Sciences*, 1739.

We are informed, by a private Letter, that Mr. *Du Hamel* having mixed *Madder* with the Food of a Pig for ſome time, and then kept away the *Madder* as long Time, found, upon ſawing the Bones through, that their interior *Laminæ* were red, while the exterior were white. And having fed another Pig ſix Weeks with *Madder*, then kept it out of its Food as long, and then mixed it other ſix Weeks; upon ſawing the Bones they were compoſed of three Layers; the external and internal were red; the middle one was white.

Mr. *Hunauld* ſees frequently the Bones of the Heads of Children intimately united without any Suture; which he thinks muſt be of the worſt

Conſequence. He demonſtrated a Nerve turning up from the ſemilunar Ganglion near the *meſenteric Plexus*, to be diſtributed to the right Auricle and Baſe of the Heart. He alſo ſhewed the lymphatic Veſſels of the Lungs, terminating in the thoracic Duct. *Hiſt. de l'Acad. des Sciences*, 1734.

Mr. *Du Vernoy* obſerves the right Side of the *Os Hyoides* to be ſhorter than the left. *Comment. Acad. Petropolitan. Tom.* 7.

Dr. *Walther* has given a very minute Deſcription of the intercoſtal Nerves, and eight Pair, which we cannot abridge. *Nov. act. erudit. Lipſiæ* 1734 *Februar. & ibid.* 1736 *Septemb.*

Dr. *Wintringham jun.* (in his *Experimental Inquiry into ſome Parts of the animal Structure*) examines the Denſity, Thickneſs, and Force of the Coats of the larger Arteries and Veins, and the Properties of the Parts of the Eye.

1. To diſcover the Denſity of the Parts, he weighs them firſt in Air, and then in Water, their ſpecific Gravities determining their Denſities.

2. To know their Thickneſs, he ſpreads them carefully on a ſmooth Surface, and then cutting off, by an Inſtrument made for that Purpoſe, ſome determinate Portion, he let it down into Water; and as Bodies, immerſed in this Fluid, poſſeſs Spaces equal to themſelves in Bulk, by comparing their Bulks together, he found, that a Quantity of Water, having the ſame Baſe, and equal to the ſolid Content of the Part immerſed, was of ſuch a preciſe Thickneſs equal to that of the Part before unknown.

3. To know the Strength of the Parts, he filled

led an Iron *Syphon*, that had a free Communication with a *condenſing Machine*, with a ſufficient Quantity of *Mercury*. Into the *Syphon* he ſcrewed a *Glaſs Gage*, above double the Height of thoſe commonly uſed. He then firmly fixed the Part, the Strength of which was to be tried, to a Tube iſſuing out of the *Syphon*; and forcing in Air, he obſerved how high the *Mercury* roſe in the *Gage*, before the Part on which the Experiment was made, burſted. By comparing the *Area* of the Part with the Height of the Mercury, he found the Force required to burſt the Part of the Animal expoſed to ſuch a Preſſure.

By Trials made on the correſponding Arteries and Veins of the ſame and of different Animals, he found, that the Coats of Veins are about $\frac{1}{10}$ more denſe than the Coats of the Arteries:—That the Denſity and Thickneſs of the Veſſels is greater in Males than in Females:—That both Denſity and Thickneſs increaſe by Age, but more remarkably in the Arteries; and, conſequently, that the Coats then bear a greater Proportion to the Diameters of the Veſſels than in young Animals: That the Strength of Veſſels is in a *compound Ratio* of the Denſity and Thickneſs of their Coats: That the Coats of Arteries are not of the ſame Thickneſs in the whole Circumference of the Canal; but, where-ever there is a Curvature, the convex Side is thicker than the concave: That the Coats of the Branches of Arteries are ſo far from becoming weaker proportionally to their becoming thinner, that, on the contrary, they are ſtronger: That this greater Strength is proportionally greater in ſome Parts than in others, according to the different

Purpoſes that are to be ſerved; ſo that it is impoſſible to ſettle any general Rule of Secretion, *&c.* from an uniform Texture of the Veſſels: That the Capacity of the Arteries in Females is greater, in reſpect of the Veins, than it is in Males: That the proportional Thickneſs of the Coats of different Arteries of the ſame Animal is very various: That the *Vena portæ* is much ſtronger, proportional to its Contents, than the *Aorta* or *Vena cava* is to its Capacity: That the Veins of ſecerning Organs are larger, and have weaker Coats, than the Veins returning from other Parts.

By like Experiments it appears, that the *Pericardium*, nay even the *Pia mater*, is much ſtronger, proportionally to its Thickneſs, than the *Aorta* is.

The Denſity of an entire *cryſtalline Lens*, ſeparated from its *Capſula*, was to Water, as 1106 to 1000. When the exterior thinner Part of the *Cryſtalline* was taken away, what remained was to Water as 1148 to 1000. The *Capſula* of the *Cryſtalline Humor* was to Water as 1046 to 1000, nearly the ſame as the *Cornea*. The vitrous Humor was as 10,024 to 10,000. The Strength of the *Cornea* is to that of the *Capſula* of the *Cryſtalline* as 7129 to 1000. By weighing Lead in Water, and in the vitrous Humor, he found the Coheſion of the Parts of the vitrous Humor to be to that of Water as 45 to 1. In an Ox's Eye, the *Cornea* was $\frac{1}{20}$, the *Capſula* of the *Cryſtalline* $\frac{1}{488}$, and the *Retina* $\frac{1}{1571}$ of an Inch in Thickneſs. By placing an Ox's Eye on a horizontal Board, and applying moveable Silk-threads, kept extended by ſmall

ſmall Plummets, ſo as to be exact Tangents to the Arch of the *Cornea*, as well at each *Canthus* as at the *Vertex*, he found, that the *Chord* of the *Cornea* was equal to 1. 05 of an Inch. The *verſed Sine* of this *Chord* was 0. 29. Then taking away the *Cornea*, he found the Diſtance of the anterior Part of the *Cryſtalline* from the *Vertex* of the *Cornea* to be 0.355 of an Inch. By the like Trial he found the *Chord* of the *Cryſtalline* 0. 74, and the *verſed Sine* of its anterior Surface 0. 189, and the *verſed Sine* of the poſterior Surface 0. 266 of an Inch. The *Axis* of the *Cryſtalline* was 0. 575, and the *Axis* of the whole Eye was 2.21 of an Inch. The *vitrous Humor* did not yield to the greateſt Force which he could apply of the condenſing Engine.

By applying Weights to Threads, placed as a Sphincter on the Edge of the *Cornea*, he found it required three Ounces two Penny Weight and nine Grains to make the *Vertex* of the *Cornea* advance $\frac{1}{20}$ of an Inch.

By putting a long ſmall Needle between the Edge of the *Uvea* and the ciliary Circle, he found it required nineteen Penny Weight, ſometimes more than an Ounce, to ſeparate the *Iris* from the ciliary Circle; and therefore the *Iris*, the Circumference of which was equal to $3\frac{3}{4}$ Inches, might exert a Force equal to nine Ounces ten Penny Weight at leaſt, before it would ſeparate from the ciliary Circle; conſequently it could raiſe the *Cornea* into a greater Sphericity.

We are too much confined by our Plan to mention here all the Conſequences Dr. *Wintringham* draws from theſe Facts. We ſhall however give a Specimen of them.

If Arteries had been as denſe as Veins, they would have oſſified by the Preſſure they undergo; and on the ſame Account the *Aorta* is not ſo denſe as its Branches.

Bleeding is neceſſary in old as well as in young People, but muſt not be ſo plentiful in the former.

Nouriſhment of old People ſhould be leſs than of young.

Diſeaſes are from Laxity in Females, from Rigidity in Males.

The *mutable Focus* of the Eye does not depend on any Motion of the *cryſtalline Humor*, nor on the Condenſation of the *vitrous Humor*; but on the Change of the Figure of the *Cryſtalline* and *Cornea*, by means of the *Iris* and *Ligamentum ciliare*.

Dr. *Stuart* (in his *Treatiſe on muſcular Motion*) having propoſed the Arguments for a Fluid of the Nerves taken from the Analogy of the Brain to other Glands, and from what we mentioned (*Vol.* II. *p.* 326.); and having ſhewn, by the Experiments there taken notice of, the great Elaſticity of the Blood-veſſels, while the Nerves have none, he tells us what Idea he has of a *muſcular Fibre*, to wit, that it is a nervous Filament formed into ſmall Veſicles, covered with a Net-work of ſmall Blood-veſſels. He quotes Dr. *Hook* affirming, that he ſaw the Fibres of the Muſcles of Fiſhes, like ſo many Onions or Pearls fixed to one another, with a Thread through them; and *Lewenhoek* acknowledging he once ſaw ſomething like to this; which, with the Analogy and ſimilar Appearances of the large hollow contractile *Viſcera*, the Heart, Lungs, Inteſtines,

teſtines, and Bladder, he thinks make a probable Proof of ſuch a Structure in Muſcles.

Suppoſing then, with the Doctor, the muſcular Veſicles contracted to the greateſt Degree, their reticulated Veſſels muſt be ſo convoluted and ſtraitened, that no Fluid can paſs through them. But when the Fluid of the Nerves diſtends the Veſicles, the Veſſels will admit Blood, and will be brought nearer to ſtraight Lines, by which they aſſiſt in raiſing the Sides of the Veſicles, to receive more nervous Fluid, the Force of which on the Sides of the Veſicles increaſes proportionally to the Increaſe of the Veſicles, as we ſee in the *Water-bellows*. When the Veſicles approach to a ſpherical Form, the elaſtick reticular Veſſels exert their elaſtick Power, endeavouring to bring themſelves to ſtraight Lines; which can only be done by contracting each Veſicle in all its Dimenſions; which is the proper *Action*, *Syſtole*, or *Contraction* of a Muſcle, by which the nervous Fluid is drove forward out of the Veſicles at the proper Outlet of the tendinous Fibres to be carried to the *Perioſteum*, from whence it is returned in the common Courſe of Circulation.

That it may not be ſaid that the nervous Fluid diſtending the Veſicles would prevent the elaſtick Contraction of the Veſſels, Dr. *Stuart* takes notice, that Muſcles which have not Antagoniſts, or thoſe whoſe Antagoniſts are cut aſunder, remain conſtantly contracted; ſo that the nervous Fluid, even impelled with the utmoſt Effort of the Mind, is not capable of diſtending the Veſicles; which would remain always contracted, if it was not the ſtretching Power of the Antagoniſts; but

but when there is an *Æquilibrium* between them, any Addition to either of them muſt make that one prevail.

The Muſcles appointed for the natural and vital Functions which have not Antagoniſt Muſcles, remain in a conſtant contracted State, till a Power ſuperior to the Elaſticity of the Veſſels diſtends the Veſicles, by which the Vigour of the Spring of thoſe Veſſels is reſtored. Thus the *Sphincters* of the *Anus* and *Bladder* retain the *Fæces* and *Urine*, till the powerful abdominal Muſcles and Diaphragm are employed to overcome their Contraction.—The Heart and Lungs have Fluids flowing into their Cavities to ſtretch them, and the Sides of theſe Cavities recoil again upon their Contents to expell them.—The Stomach and Inteſtines have the Food and expanſile Air acting irregularly on them, and ſo occaſioning their Contraction in an uncertain Way.

The Muſcles of voluntary Motion have all Antagoniſts, which keep them in *æquilibrio*, till the Mind directs more nervous Fluid into one than another. The Veſicles that are diſtended with this Fluid, receive more Blood into their reticular Veſſels, while the Veſſels of the Antagoniſt Muſcle receive leſs, becauſe of their larger Veſſels coming from the ſame common Trunk. After the Veſſels of the Muſcle, which the Mind thus influences, are brought to their extended State, they exert their ſtrong Power of Elaſticity, and come to their contracted State, when the lengthened Muſcle prevails, and ſhortens itſelf, till the Power of both is brought to an *Æquilibrium* again.

From

From this Doctrine, the Doctor accounts for Muſcles being harder, paler, and of leſs Volume when ſtretched, but eſpecially when fully contracted; and illuſtrates this by Obſervations on the Motion of the Guts of a living Rabbit, Parts of which were diſtended with Air confined by a ſtrong Contraction of the muſcular Fibres above and below the diſtended Part; for the diſtended Part had its Veſſels full, while the contracted Parts were pale. By his Doctrine too he explains Dr. *Gliſſon*'s Experiments of immerſing the Arm into a Veſſel full of Water; which ſubſides, rather than riſes, when the Muſcles contract violently.

There are a great many Glands in the Body, which have no particular excretory Ducts; Dr. *Quietſchius* would have theſe called *Glandulæ cæcæ* or *clauſæ*. Inſtead of being *lymphatic*, which is the common Opinion, he argues for their being deſigned to prepare Nouriſhment to the other Parts; and particularly for the *Glandulæ apertæ*. What he chiefly founds his Opinion on is, obſerving the *Glandulæ cæcæ* decreaſing after Birth to full Growth, then continuing in nearly the ſame Condition, till old Age comes on; after which they gradually ſhrivel. For, ſays he, the great Increaſe of the Body in Childhood exhauſts them; in middle Age, the Waſte and Supply is near equal; in old Age, the Liquors are no more ſupplied, and theſe Glands decay; the open Glands keeping up, till the ſhut ones are entirely exhauſted; after which the open Glands waſte too. *Select Medica Francofurtenſ. Tom.* 2. *Vol.* 1. § 3.

Dr. *Chevalier* defends (in a *Theſis*) *Fracaſſatus*'s

tus's Opinion of the Motion of the Brain being owing to the Air entering by the Olfactory Nerves into the Ventricles of the Brain; which Air, rarefied by the Heat, loſes its Spring, and is expelled by the elaſtick contracting *Dura Mater*.

Mr. *Le Cat* (in the *preliminary Diſcourſes to his Phyſiology*) explains his Notions of our Solids and Fluids; among which there are ſeveral uncommon. We ſhall mention one or two. A *cauſtick Fluid* is, according to him, what detains the Blood in a fluid State, and forms the red Globules; but this needs the Aſſiſtance of the *animal Fluid*, which is the Principle that preſerves all from Corruption; and to it we owe our Senſation and Motion. This *animal Fluid* paſſes in the proper nervous Tubes to the Organs of Motion; but is contained in the fibrous Coats of the Nerves, to become an Organ of Senſation. This *ſenſitive Fluid* is, he ſays, capable of thinking; and is ſo modified by the *Ganglions*, that what is lodged in each Part is capable of being impreſſed by the Object proper to each Organ. From this Doctrine concerning this *animal Fluid*, he endeavours to account for moſt Operations, which are generally ſaid to depend on the Soul.

In his Treatiſe on the Organ of Sound, he has ſome new Figures of ſome Parts of the Ear; and propoſes an Inſtrument, as of his own Invention, to aſſiſt dull Hearing. It conſiſts of a Shell or Cornet of Copper, into which a ſmall Funnel-like Tube is fixed, ſo as its narrow End is at the Center of the Cornet. Dr. *Parſons*, *Philoſ. Tranſ.* Num. 466. § 9. ſays this Inſtrument is common in *England*.

The

The Picture which Mr. *Le Cat* gives of the Base of the Brain, with the several Nerves and Vessels, is new and elegant.

In his Description of the Parts of the Eye, he says the *Pia Mater* gives three Membranes to the Eye. The first lines the *sclerotic Coat*, and is joined to it; the second is the *choroid Coat*; and the third is the *villous mammary* one, proceeding from the *Choroid*, and is commonly called *Ruysch's Coat*.

He strenuously defends Mr. *Marriot*'s Opinion of the *choroid Coat*, and not the *Retina*, being the immediate Organ of Vision. The *Retina*, according to him, is to the *Choriod*, what the *Epidermis* is to the Skin.

The Figure he gives of the *lacrymal Gland* and *Ducts* is new, representing the Parts in their natural Posture.

In his Doctrine of Light and Colours, he differs in some Things from Sir *Isaac Newton*. But our Design will not allow us to follow our Author in his Account of this Subject, and the Explication which he gives of the *Phænomena* of Vision.

Morgagni has at last performed his Promise, (See our *Vol.* II. *p.* 314.) He has published a new Edition of *Valsalva*'s Treatise *de aure humana*; and to that he has joined the posthumous Dissertations; both making a Volume in *4to*. He has accompanied these with eighteen Letters of his own; which make two Volumes in *4to*.

Morgagni's Remarks on the Ear, Heart with its Vessels, Nerves, Intestines, Eyes and *Glandulæ renales*, are made with the Accuracy so conspicuous in all that great Anatomist's Wri-

tings. An hiſtorical Account is generally premiſed of what has been ſaid on each Part of the Subject he treats of; and then he relates *Valſalva*'s and his own Deſcriptions and Obſervations made in a Variety of Animals, but particularly on the human Body. The Number and Variety of theſe Remarks, conſiſting chiefly of accurate minute Deſcriptions, makes it impoſſible for us to enter upon a Detail of them in the narrow Compaſs to which we are confined.

Dr. *Caſſebhom*'s Treatiſes on the *Ear*, being only minute Deſcriptions of Parts, we cannot abridge him; and muſt therefore refer to his Book.

Dr. *Vaterus* is of opinion, that the Tears come from the white Lines ſeen on the Inſide of the *Palpebræ*, deſcribed by *Meibomius*. He obſerved two ſmall Ducts beſides the common naſal Duct from the *lacrymal Sac* into the Noſe; one of them opened into the upper Part of the Noſe, the other opened into the *antrum maxillare*. *Miſcellan. Berolin. Tom.* 4. *Pars* 3. § 5.

Mr. *Ferrein* demonſtrated to the *Academy of Sciences* at *Paris*, the lymphatic Veſſels of the *Uvea* of the human Eye. *Hiſtoire de l'Acad des Sciences*, 1738.

Mr. *Weitbrecht* gives an accurate Deſcription and Picture of the *frontal*, *occipital*, *palpebral*, and *facial* Muſcles; which is too long to tranſcribe, and cannot be abridged. See *Comment. Acad. Petropolit. Tom.* 7.

The Tongue is generally eſteemed a neceſſary Organ in ſwallowing and taſting; yet a Woman, who loſt her Tongue entirely by a Cancer when four Years old, ſpeaks diſtinctly, ſings prettily,

prettily, swallows easily, and tastes accurately. *Philos. Transact.* Num. 464. § 11.

Mr. *Petit* the Surgeon endeavours to prove, that, in sucking, Children principally force down the Milk from the Breast by the Pressure of their Lips and Tongue making a little Void at the End of the Nipple, to assist the Flow of the Milk each Time they swallow. *Memoires de l'Acad. des Sciences*, 1735.

Mr. *Weitbrecht* concludes, from the small Quantity of Blood thrown out of the Heart into the Arteries, and the great Resistance in the capillary Arteries, that all or much the larger Share of what is sent out of the Heart, is retained in the Arteries during the *Systole* of the Heart, and is sent forward into the Veins, by the Contraction of the Arteries, but so that the Veins can have no Pulsation; because as much as is received from the Veins, is thrown into the Heart at the same time. The Smallness of the Quantity of Blood thrown out of the Heart, makes him think that the Pulsation of the Arteries cannot be so much owing to their Distension, as to their Change of Place; and he says, he perceives upon Trial, that all the Arteries of the Body are not dilated nor contracted at the same time.

He likewise argues, that the Weight of the Blood contributes nothing to its Motion, because the Arteries and Veins are to be looked upon as *Syphons*, where the Blood in the two Legs must be *in æquilibrio*. Nor can the greater Length of the arterious Leg, according to him, have any remarkable Effect in the Circulation, otherwise we should be much disordered in lying horizontally.

Mr. *Weitbrecht* allows the Attraction in the ſmall capillary Veſſels to be the ſame as in any other ſuch Tubes; but ſeeing *that* is always confined to a determined Extent, and cannot exert its Power in larger Veſſels, he does not think this Attraction is what carries the Blood into the Veins.

The *Auricles*, according to our Author, ſerve to give an *Impetus* to the Blood on the *Ventricles* of the Heart; for the Blood moves ſo ſlow in the Veins, that its *Momentum* would not be ſufficient to diſtend, and to give a great enough Spring to the Ventricles. The pulmonary Blood acquiring conſiderable Velocity by the Motion of the Lungs, requires a much leſs Auricle than the Blood of the *Venæ cavæ*. *Comment. Acad. Petropolit. Tom.* 6. & 7.

From the Experiments made on living Animals by Dr. *Houſton* (*a*), Dr. *Hoadley* (*b*), and Mr. *Bremond* (*c*), the Lungs ſeem to act independent of the *Thorax*, continuing to be dilated and contracted after they are expoſed to the Air. We regrete that a Detail of theſe Experiments would take too much Space to be inſerted here, and that on this account we are obliged to refer to (*a*) *Philoſ. Tranſact.* Num. 441. § 4. (*b*) *Lectures on Reſpiration.* (*c*) *Memoires de l'Acad. des Sciences*, 1739.

Dr. *Hoadley* (in his *Lectures on Reſpiration*) endeavours to prove, that the *external intercoſtal* Muſcles ſerve for Inſpiration, while the *internal Intercoſtals* are their Antagoniſts, depreſſing the Ribs in Expiration. Upon conſidering the Directions of the Fibres of theſe Muſcles, and the Motion of ſeveral Ribs, the Antagoniſm of the Muſcles

Muſcles muſt, he thinks, appear evident; for the Fibres of the *internal* intercoſtal Muſcle muſt be lengthened when the Ribs are raiſed; whereas, ſays he, all contracting Muſcles are ſhortened. Several Authors have been of his Opinion, and Mr. *Bayle* of *Tholouſe* mentions a Demonſtration for it.

He thinks it proved by Dr. *Hales*'s Experiments, (*Vegetable Staticks*, Exp. 112. and 113. and *Hæmaſt. p.* 83.), that there is Air in the Cavity of the *Thorax* between the Lungs and the *Pleura*; and endeavours to take off the Force of Dr. *Houſton*'s aſſerting that he ſaw the Lungs and *Pleura* contiguous. He grants, however, that ſometimes there may be little or no Air. He accounts for Reſpiration nearly in the ſame way with thoſe who aſſume the Contiguity of the Lungs and *Pleura*.

He joins with thoſe who think the *Impetus* which the internal Surface of the Lungs ſuſtains in common Reſpiration to be very little; ſuch, to wit, as would be equal to a Column of Water (whoſe Baſe is the internal Surface of the Lungs, and whoſe Height is but $\frac{1}{7000}$ Part of an Inch) moving with a Velocity no greater than what would carry it through an Inch in a Second of Time.

According to our Author, the Uſes of Reſpiration are, to diſcharge from the venal Blood and Chyle ſuch Parts as are unfit to render them arterial Blood, and to admit Air into the Blood.

From this Doctrine, he endeavours to account for the *Phænomena* of the Diſeaſes of the Lungs.

He ſubjoins the Picture and Deſcription of a very ingenious Inſtrument he has contrived for

illuſtrating the Manner in which he thinks Reſpiration is performed.

Mr. *Petit* the Phyſician, examining the Body of a Child that had lived few Hours after Birth, ſaw the Lungs of the right Side ſuch as is common to thoſe who have breathed; but thoſe of the left Side were as of a *Fœtus*, and ſunk in Water; which was owing to the *Trachea* being blocked up with a thick glairy Matter: whereas all the *Mucus* in the *Trachea* of a *Fœtus* is not above fourteen or ſixteen Grains; which does no more than beſmear the Surface of the Lungs when the Air ruſhes in.—Mr. *Petit* ſays, that, when once the Lungs are blown up, the Air cannot be preſſed out with the Fingers, but may be exhauſted by keeping the Lungs in the exhauſted Receiver of an Air-pump.—He obſerves, that there is generally more Liquor in the *Thorax* of *Fœtuſes*, than of Animals which have breathed. To know if this Liquor came from the Cavity of the Lungs, he poured Water into the *Trachea*; but none of it paſſed through the Membranes of the Lungs. He ſeems inclined to believe, that this Liquor in the *Thorax* of *Fœtuſes* is furniſhed by the *Thymus*. *Memoires de l'Acad. des ſciences*, 1733.

Dr. *Boeſel* relates an Example of a Child certainly born dead, whoſe Body was not diſſected till it was conſiderably putrified; its Veſſels were full of Air; and Veſicles diſtended with it, were ſeen on the Lungs, which ſwimmed in Water, unleſs when a little Piece of their internal Subſtance, free from all Bubbles of Air, was cut out; ſuch a Piece thrown into Water, ſunk to the Bottom

Bottom of the Veſſel. *Commerc. Norimb. anno* 1736. *Hebd.* 1. § 2. How cautious ought they to be who examine the Bodies of Infants, in order to make a judicial Report?

Mr. *Ferrein* obſerves, that each Lobule of the Liver conſiſts of an external friable yellowiſh-red *cortical* Subſtance, and of an internal ſoft pulpous *medullary* Part, placed in the Center of each Lobule. He is of opinion, that the medullary Subſtance is the pulpy Extremities of the biliary Ducts, proceeding from the cortical Part.

According to him, the Blood in the hepatic Artery has Bile ſecreted from it, and its remaining Blood is conveyed by Veins into the *Vena portarum*, where a ſecond Secretion is made from it. Beſides the Secretion of Bile made from the hepatic Artery and *Vena portarum*, our Author ſays, he has ſeen biliary Ducts coming from the left Ligament of the Liver, from the Diaphragm, Coats of the Gall-bladder, and Part of the *Vena cava*; all which he affirms may be ſeen, by injecting coloured Liquors into the Trunks of the hepatic Ducts.

In Mr. *Ferrein*'s Opinion, the Bile is equally bitter and ſtrong in the ſmalleſt biliary Canals, as in the larger Trunks; the thick yellow Bile ſometimes found in the Trunks being the *cyſtic* Bile, remounting from the *Ductus communis choledochus* into the *hepatic* Duct; on which account the hepatic Duct is often of a larger Diameter than the common biliary Duct.

He mentions how to trace the lymphatic Veſſels to the extreme Branches of the *Vena portarum*, and to the biliary Ducts, by injecting Liquors

quors into the larger Trunks of the external Lymphatics.

The lymphatic Veſſels of the Kidneys appear, he ſays, upon blowing Air by the *Ureter* into the *Pelvis* of the Kidney, *Hiſtoir. de l'Acad. des Sciences*, 1733.

Mr. *Lieutaud* argues for the *Spleen*'s being larger by a greater Quantity of Blood in it, when the Stomach is empty; and that this Blood is preſſed out when the Stomach is full, to increaſe the Secretion of Bile. *Hiſt. de l'Acad. des Sciences*, 1738.

Mr. *Du Vernoy* remarks the *Glandulæ renales* to be very variable in their Magnitude, Figure, *&c.* but that they are always contiguous, and firmly connected to the Kidneys. In ſome *Fœtuſes* they appear ſolid, without any Cavity; in others they are diſtended with thin Blood. In Adults they are always flat. They are readily diſtended, by blowing Air into them by their Vein. When the Glands are opened, and Quickſilver is injected, a great many Ducts are ſeen at which the Mercury runs out. Two Arteries and a Vein belong to each Gland, and a great many Ducts diſpoſed like Rays, *radiorum formâ*, make a Circle round it. An Artery riſing from the *Aorta* is ſent down from the lower Edge of the *Gland* to the *Teſtes* of Men, and *Ovaria* of Women; which, he thinks, *Valſalva* miſtook for Ducts. *Comment. Acad. Petropolit.* Tom. 5.

Mr. *Weitbrecht* gives a better Deſcription of the Figure and Situation of the human Bladder, than in the common anatomical Syſtems. *Ibid.*

Dr. *Agricola* deſcribes a Valve at the Entry of the

the *Canalis arterioſus* into the *Aorta deſcendens*, compoſed of four Sides; two of which, he ſays, prevent its being ſhut till after Birth, and the other two prevent its being thruſt off from the Orifice of the *Canalis arterioſus*. *Commerc. Norimb.* 1735, *Hebd.* 4. § 2.

Dr. *Trew* endeavours to ſhew, how, after Birth, the *umbilical Vein* and *Arteries*, ſeparating from the Navel, gradually retract within their *Sheaths*, which they have from the *Peritoneum*; and how the Sides of the *Sheaths* grow together, as the Sides of the Remains of the Veſſels alſo do: So that the Hæmorrhagies, which ſometimes happen at the Navels of Adults, muſt not be from the umbilical Veſſels, but from ſome other. *Commerc. Norimb.* 1737, *Hebd.* 13. § 1.

Dr. *Stack* informs us of a Woman, aged ſixty eight Years, who gave ſuck to two Grandchildren; the firſt brought Milk into her Breaſts, by ſucking when ſhe put her Nipple into its Mouth, to quiet it in Abſence of her Daughter, its Mother. *Philoſoph. Tranſact.* Num. 453. § 10.

Dr. *Martin* (*Tract. de ſimilib. animalib.*) treats of the Laws and Proportions of the Motions and Forces of the Solids and Fluids of Animals, of however different Magnitudes, which are ſuppoſed of ſimilar Make and Conſtitution, but in a Manner that makes it impoſſible for us to abridge his numerous *Propoſitions*, *Scholia* and *Corollaries*, in ſuch ſmall Compaſs as we are confined to.

The Editor of *Boerhaave*'s *Phyſiologia*, with the Figures of the Parts copied from the Books which *Boerhaave* cites, ſays very juſtly, that the

the Pictures ſerve to make the Text be better underſtood, and may ſave the Trouble of conſulting a great Number of Books.

Dr. *Haller* (in *Boerhaave's Prælect. Acad. in proprias Inſtitut. cum notis)* has not only collected from the beſt Authors what relates to the animal Œconomy, but has corrected and improved them in a great many Particulars.

Mr. *Le Cat* has contrived a Hammock of *Turky* Leather, which may be eaſily raiſed or let down with a ſick Perſon in it, by Ropes and Pulleys. *Philoſoph. Tranſact.* Num. 468. § 8.

In our *Vol.* IV. *p.* 386. we mentioned Mr. *Petit*'s Opinion of Hæmorrhagies from cut Arteries being ſtopped by a Plug of clotted Blood; he has ſince ſhewn to the *Academy of Sciences* ſuch a Plug in an Artery. *Memoires de l' Acad. des Sciences*, 1735.

Mr. *Morand* endeavours to prove, that the Contraction of the Coats of Arteries, and the Concretion of their Sides, are the principal and ſureſt Means of Stopping the Effuſion of Blood from them. *Memoires de l' Acad. des Sciences*, 1731.

Some *German* Phyſicians endeavour to reſtore the Reputation of *Digby*'s *Sympathetic Powder* for ſtopping Hæmorrhagies, by relating two Examples of its Succeſs. Violent Hæmorrhagies, ſay they, were ſtopped, by dipping a Cloth wet with the Patient's Blood into Water, in which *Cyprian* or *Hungarian Vitriol*, calcined in the Sun, had been diſſolved. *Medic. Sileſiac. Satyr.* Spec. 2. Obſ. 8.

Mr. *Godfrey* (*Miſcell. verè util.*) affirms, that, by immerſing a burnt Part into cold Water

ter for ſeveral Hours, adding freſh cold Water from time to time, all the Pain of burning may be prevented, and the Part will cure afterwards with a ſimple Ointment of *Ceruſs*, *Oil*, *Sperm. Cet.* &c.

Wounds of the Head have been long obſerved to be frequently very fallacious. Some that ſeemed to be very ſlight Hurts, have proved mortal; others, attended with very violent Symptoms, have cured, with very little Aſſiſtance from Art.

Mr. *Queſnay* examines the doubtful Caſes where the *Trepan* ought or ought not to be applied; and, after relating a great many Hiſtories, concludes for performing the Operation as the ſafeſt Method, where it is ambiguous whether there is Extravaſation of Liquors, or Depreſſion of the Skull.

He takes notice of a Remark of Mr. *Petit*, that where the Patient becomes at firſt ſtupid or lethargic, but recovers from theſe Symptoms ſome time after, they depend on a Concuſſion of the Brain. But, either if theſe Symptoms continue, notwithſtanding proper Evacuations, or if they appear ſometime after the Hurt is given, then the Brain is compreſſed.

Mr. *Queſnay* mentions Examples of very contuſed Wounds of the Teguments of the Head, which were cured by Concretion.

Several Caſes are related, to prove, that the Adheſion of the *Pericranium* to the Skull, is no ſure Sign of the Bone's being entire; and that the Separation of the *Pericranium* from the Skull, is as unſure a Sign of the *Cranium* being broken.

Examples of Contrafiſſures are alſo related.

He

He tells ſeveral Hiſtories of the *Trepan* being performed ſeveral Times with Succeſs for the ſame Diſeaſe, and of very large Parts of the Skull being taken away, without Loſs of the Patient's Life.

He remarks, that a ſort of *Hernia* is ſometimes formed at the Aperture of the *Cranium*, after a Cicatrice is formed in the Teguments, and mentions a Caſe treated by Mr. *Mareçhall*, where ſuch a *Hernia* occaſioned Convulſions, which were cured by keeping a proper Bandage on the Parts, to prevent their being protruded.

Mr. *Queſnay* ſays, the Apertures of the Skull are ſometimes filled with a Subſtance which comes from the Edges of the Bone, and gradually oſſifies. Sometimes a hard *Callus* has been obſerved to come from the *Dura Mater* to fill the Hole. He encourages Surgeons to open Abſceſſes when they form in the Brain, and even to puſh a Lancet into the Brain, when the Symptoms indicate a Suppuration, tho' the *Pus* is neither felt nor ſeen.

He aſſures us from Experience, that ardent Spirits are not ſo proper for preventing the Growth of *Fungus* from the Brain, as *Balſam. Fierovanti*, or *Ol. Terebinth.* He recommends *Mel Roſar.* as a good Medicine to be injected within the Skull. *Memoires de l' Acad. des Chirurg.* Tom. 1.

Mr. *Petit* conſiders the Canals for the Tears from the *Puncta lachrymalia* as a *Syphon*, the longer Leg of which is the naſal Duct; and therefore thinks, that a ſhorter Paſſage made through the *Os unguis* would not convoy away the Tears; for which Reaſon he would always have

have the natural Passage forced open in the *Fistula lacrymalis*, and to keep a small *Bougie* in it till it heals. *Memoires de l'Acad. des Sciences*, 1734.

The *Pterygion* cured in a Dog, and afterwards in a Woman, by bathing with a Malt Spirit. *Commerc. Norimb.* 1739, *Hebd.* 44.

Dr. *Burghart*, in a *Chemosis*, or violent inflammatory Swelling of the Eye, where the *Cornea* was already burſted, dilated the Opening, and extracted the *crystalline Lens*, which had come forward before the *Iris*. That *Lens* was so changed and suppurated, that it resembled a Piece of white Amber; after extracting it, the Pain of the Eye became milder. *Medic. Silesiac. Satyr. Spec.* 2. *Obs.* 4.

Mr. *Petit*, after relating the History of a Woman who had a complicated Tumor of the *Trachea*, gives two Cautions in such Cases. 1. To inquire very particularly whether the Patient has the *Lues venerea*. 2. To guard against a Ring, or Part of the *Trachea* falling into this Pipe when it exfoliates. *Memoires de l' Acad. de Chirurg.* Tom. 1.

Mr. *Bevin* gives a long Detail of the Misfortunes that have happened from hard or sharp Substances that were attempted to be swallowed, and of the Method proposed for remedying each, whether the Body swallowed is lodged in the *Oesophagus*, *Trachea*, *Stomach*, or *Intestines*. We cannot abridge this Work, and shall only observe Mr. *Petit*'s Improvement on the Stilet for extracting Pins or Fish-bones sticking in the *Oesophagus*; which is to have several little Rings of Wire or Thread at the End of a flexible

Probe or Wire. *Memoires de l'Acad. de Chirurg.* Tom. 1.

Mr. *Foubert* obſerved a Tumor between the *Xiphoid Cartilage*, and the Edges of the Cartilages of the Ribs, occaſioned by an Abſceſs within the *Thorax*. *Memoir. de l'Acad. de Chirurg.* Tom. 1.

Mr. *Amyand* relates the Hiſtory of a Gentleman, who, after being cured of an Ague by the *Bark*, complained of Weight, Hardneſs, and Uneaſineſs in the Liver, with *Borborygmi* and Coſtiveneſs, for which he frequently took Purgatives. After being fourteen Years in this Way, he had ſome Symptoms of the *Jaundice*. After ſeveral Weeks more, an inflammatory Tumor was obſerved in the right Hypochondre; which ſuppurated; and, when opened, diſcharged purulent Matter ſome Days. The Quantity of *Pus* decreaſing, there was a ſudden Diſcharge of a great Quantity of yellow bilious Matter from the Sore. Forty Pounds of this were computed to have flowed out in twenty five Days. The Symptoms of the *Jaundice* going off, he became coſtive, had Phyſick, catched Cold, fevered, and died lethargic.

His *Gall-bladder* was found extended into a Bag, capable of containing three Pounds of Liquor; and was connected to another ſmaller Bag, where the *Pus* had been lodged. Several Bags were formed in the Coats of the Gall-bladder. Theſe contained a cretaceous Matter, with hard white Stones. The *cyſtic* Duct was ſo contracted or blocked up, that nothing could paſs through it. The *hepatic* and the *common bilary* Ducts were open, but empty. A *bilary* Canal,

Canal, formed of ſeveral Branches which joined within the Liver, opened itſelf into the *Gall-bladder*. The Liver was found in appearance. *Philoſ. Tranſact.* Num. 449. § 7.

Dr. *Stuart*'s Account of theſe Symptoms, *ib.* § 8. may be gueſſed from what is in our *Vol.* III. *p.* 321, *&c.*

Mr. *Petit* gives the Marks by which ſuch a Diſtenſion of the *Gall-bladder* from *Bile*, as makes an external Tumor with Fluctuation, may be known and diſtinguiſhed from an Abſceſs formed in the Liver. In both Caſes there is Fever, Pain, Shivering, Tumor, *&c.* proceeding. But, 1. When the Abſceſs begins to form, the Pain increaſes; whereas it diminiſhes when the *Gall-bladder* is diſtended. 2. The Pain of the Suppuration is pulſatory; which the other is not. 3. The Pain goes ſooner off, and leaves the Patient more in Spirits, when there is no Suppuration. 4. The Shivering in the Suppuration continues longer, the Pulſe is ſmaller, and it terminates in a Sweat; whereas, in the Diſtenſion of the *Gall-bladder*, the Shivering is of ſhort Continuance, the Pulſe is ſtronger, and there is no Sweat. 5. The diſtended *Gall-bladder* is like an incyſted Tumor, firm, equal, and circumſcribed. The Abſceſs is more diffuſed. 6. The *diſtended Gall-bladder* is always ſeen below the Cartilages of the Ribs. The Abſceſs of the Liver forms any where in the epigaſtric Region. 7. The Fluctuation of the Liquor in the *Gall-bladder* is all felt at once over the whole Tumor. The Fluctuation of the Abſceſs becomes gradually more perceptible; and there is always ſome Hardneſs round it.

When

When the Gall is collected in its Bladder, if an Inciſion is made into it, it runs into the Abdomen, and ſoon deſtroys the Patient, unleſs when the Gall-bladder is adhering to the *Peritoneum*; which Mr. *Petit* ſays may be known to be the Caſe; 1. When the Tumor cannot be made to change Places. 2. By the Sponginess and Redneſs of the Teguments. 3. By there having been frequent Returns of Inflammation.

When an Abſceſs and a *diſtended Gall-bladder* happen at the ſame Time, it is difficult to diſcover the latter.

When the Gall-bladder can be opened, ſo that the Bile may all be evacuated at the Orifice, it is to be done; and, if there are any Concretions lodged in it, they are to be extracted. *Memoires de l' Acad. de Chirurg.* Tom. 1.

Dr. *Kaltſchmeid* adds a Stopcock to the *Canula* of his Trocars, that he may evacuate the Water of Dropſies at pleaſure. *Commerc. Norimb.* 1738. *Hebd.* 38. § 1.

Mr. *Amyand*, after deſcribing a tedious Operation of the *Bubonocele*, which he performed, where he was obliged to cut away the *Omentum*, which adhered to the Rings of the Muſcles, and to ſeparate the *Appendix vermiformis*, which contained a Pin that had pierced it, obſerves, that *Herniæ* return after the Operation of the *Bubonocele*, as it did in this Patient, and three or four more; and that the *Omentum* may be cut ſafely without any Ligature put upon it.

In the Diſſection of an old *Hernia*, Mr. *Amyand* ſaw one Side of the *Inteſtinum Ilium* ſtretched out into a blind Tube, like to the *Appendix vermiformis*. *Philoſoph. Tranſact.* Num. 443. § 8.

Mr.

Mr. *Amyand* remarks alſo, that *Herniæ*, where the *Omentum* falls down with the Inteſtines, are more dangerous than where the Gut is alone; becauſe the *Omentum* hinders the Reduction of the Gut, grows to the Rings of the Muſcles, ſwells and forms a thick Ring, which ſtrangulates the Gut.—He again repeats his cutting off a Part of the *Omentum*, without tying it, and without *Hæmorrhagy*. *Philoſoph. Tranſ.* Num. 450. § 2.

Dr. *Sacks* greatly recommends Lintſeed, from which the Oil has been expreſſed, boiled in Milk, and applied warm in a Cloth on *Herniæ*. *Satyr. Sileſiac.* Specim. 4. Obſ. 4.

Mr. *De la Peyronie* obſerved the Strangulation of the Inteſtine to continue after the Reduction of a *Hernia*, occaſioned by the *Omentum* grown to the interior Part of each Side of the Paſſage. *Memoires de l' Acad. de Chirurg.* Tom. 1.

Mr. *De la Peyronie* alſo relates Hiſtories of mortified Pieces of Inteſtines in *Herniæ* cut away, and a Cure made by keeping the Extremities of the Gut near to each other, and near to the Rings of the Muſcles, with a Stitch through the Meſentery. The Ends of the Inteſtine grew to the *Peritoneum*; and the new Fleſh was extended along this Membrane, to ſolder the Extremities together. The ſoldered Part of the Gut is always ſtraitened; and therefore, whoever are cured in this Caſe, had need to guard againſt too full Meals and Indigeſtion. A Woman who had been cured in ſuch a Caſe, as is deſcribed above, and had tranſgreſſed, by eating too plentifully, fell into vomiting; which burſted her Gut, and ſhe died in few Hours.

The upper End of a divided Inteſtine ought carefully to be kept near the external Orifice, that the Remains of the Food may not fall into the Cavity of the Abdomen. *Mémoires de l' Acad. de Chirurg.* Tom. 1.

Spring Steel-truſſes ſeem to be known but lately in *France*, the Deſcription and Picture of one being inſerted into *Memoires de l' Acad. de Chirurg.* Tom. 1.

Mr. *Garengeot* relates Examples of uncommon *Herniæ*, to wit, near the *Xiphoid Cartilage*, into the *Vagina*, and through the Hole common to the *Os Pubis* and *Iſchium*, at the Place where the Veſſels and Nerves paſs. The elaſtic Subſtance they contain, and the common Symptoms of ſtrangulated Inteſtines, may lead one to diſtinguiſh them from the other Tumors of thoſe Parts. *Mem. de l' Acad. de Chirurg.* Tom. 1.

Mr. *Amyand* mentions the Colon being cured after being wounded with a Bullet. When he opened the Body ſeveral Years after, he ſaw the Part of the Gut formerly wounded, then conſiderably contracted. *Philoſ. Tranſact.* Num. 443. § 8.

Dr. *Wolfius* relates the Hiſtory of one whoſe *Inteſtinum Ilium* was burſted by the Fall of a Stone on his Belly. *Philoſ. Tranſ.* Num. 445. § 12.

Mr. *Frike* propoſes to employ a *Syringotom* of a new Form, for laying open *Fiſtulæ in ano*, which run up on the Side of the *Rectum*, without having any Perforation into its Cavity. His Inſtrument is of the Form of a Pair of Sciſſars, the Blades of which are about the Breadth of the *Royal Biſtoury*, and are crooked. One of the Blades has

has a very ſharp Edge, but a blunt Point; the other has a very ſharp Point, but blunt Edge. By the Means of a ſliding Button, the blunt Edge of the one, and the blunt Point of the other Blade, are made to ſtand out beyond the ſharp Edge and Point, ſo as to defend them, while the Handles of the Blades are kept at a little Diſtance. The Inſtrument being introduced into the *Fiſtula*, while the two Blades are kept in this Poſture by the Button, whenever the Extremity of it touches the Bottom of the *Fiſtula*, the Button being ſlid away, the Handles are preſſed together; which makes the ſharp Point of the blunt Blade to perforate the Inteſtine; and immediately the Handles being drawn aſunder, the ſharp-edged Blade is advanced before the other, and, with a Finger of the left Hand introduced into the *Rectum*, is directed to lay the whole open, as is done commonly with the *Royal Biſtoury*. *Appendix to Barroughby's Tranſlation of Aſtruc's Treatiſe on the Fiſtula in ano.*

Mr. *Faget* adviſes to ſlit open the *Inteſtinum rectum*, whenever it is laid bare by an Abſceſs; and gives an Example of a Cure which he made, by cutting away the Extremity of this Gut, which had been laid bare all round by Abſceſſes. *Memoires de l'Acad. de Chirurg.* Tom. 1.

Mr. *Petit* obſerves, that it is very difficult to hit of the right Part for making a Perforation into the *Rectum* of Children born without any *Anus*; for he finds generally the Extremity of the Gut formed into a Knot. For performing ſuch a Perforation, he recommends a *Trocar*, the *Canula* and circular Plate of which are ſo ſlit open, as to ſerve as a Groove for a Lancet

or

or Biſtoury to be run in, to inlarge the Aperture, after the *Trocar* has been puſhed into the Gut. *Mem. de l' Acad. de Chirurg.* Tom. 1.

Mr. *Le Cat* was very ſucceſsful in performing the *lateral Operation for the Stone.* He found great Advantage to his Patients from the *warm Bath*, when they were threatened with Inflammation. *Hiſtoire de l' Acad. des Sciences*, 1734.

Mr. *Le Cat* makes a Groove on the right Side of his Lithotomy Inſtruments, which aſſiſts him to introduce them more readily. He employs a narrow convex edged Knife to ſlit the *Proſtata* and Neck of the Bladder. Since he has made uſe of this Inſtrument, his Operations have been more ſucceſsful. *Hiſt. de l' Acad. des Sciences*, 1738.

Mr. *Foubert* performs Lithotomy in the following Manner. He either injects a mild Liquor into the Bladder, or he ties a Ligature on the *Penis*, to retain the Urine till the Bladder is ſtretched.—When he obſerves that the Bladder is very much contracted, which he knows by the ſmall Quantity of Urine emitted by the Patients at once, he keeps them drinking large Quantities of a ſoftening Ptizan, recommending to them to retain their Urine as long as they can. The Bladder being diſtended, he thruſts a very long *Trocar*, the *Canula* of which is open on one Side, into the Bladder, from the middle Point between the *Anus* and *Tuberoſity* of the *Os Iſchium*, then drawing the *Stilet* of the *Trocar* back ſome Way, he puſhes a Knife along the Slit in the *Canula*; and, when it is in the Bladder, he raiſes the Point to cut the interior Parts; then, reſting

reſting the Point on the *Trocar*, he raiſes the Handle to make a large enough external Inciſion. For making theſe Inciſions more conveniently, his Knife is narrow bladed, and ſet into its Handle at a conſiderable Angle. The Inciſion being made, the *Gorgeret* is introduced; and all the reſt of the Operation is the ſame as in the common lateral Operation. *Commerc. Norimb.* 1739, *Hebd.* 6. 7. 8. *Memoires de l' Acad. de Chirurg.* Tom. 1.

We are informed by a private Letter from *Paris*, that Mr. *Faget* propoſes a different Way of *Lithotomy* from any yet practiſed. The Patient being in the ſame Situation as for performing the Operation in *Johannes de Romanis*'s Way, the furrowed Catheter, introduced into the Bladder, is puſhed ſtrongly backwards; the Operator cuts the Skin and Teguments from near the *Os Coccygis* to near the *Tuber* of the *Iſchium*; and then, with a ſmall Knife, cuts the back Part of the Bladder upon the Groove of the Catheter, introduces the *Gorgeret*, and performs what remains of the Operation in the ordinary Way.

Mr. *Nourſe* ſhewed to the *Royal Society* the Bladder of a Man, in which ſix *Sacculi* or Bags were formed by the Protruſion of the internal Coat of the Bladder through the muſcular. In theſe Bags nine Stones were contained. *Philoſoph. Tranſ.* Num. 462. § 3.

Mr. *Houſtet* has collected a great many Inſtances of Stones lodged in Sacs formed in the Bladder, from which it was impoſſible to extract them, without tearing the Bladder, or cutting one Side of the Sac; which Mr. *Garengeot* did

once

once with Succeſs. In ſome of the Caſes which he mentions, the Veſſels of the Bladder were, in appearance, grown into the Stone; and the Extraction of the Stone was attended with a mortal Hæmorrhagy. *Mem. de l'Acad. de Chirurg.* Tom. 1.

Mr. *De la Peyronie* mentions Examples of Impediment to the Ejection of the *Semen maſculinum* in Coition, by a wrong Direction which the Orifices at the *Veru montanum* got, whereby the Seed was thrown up into the Bladder.

Mr. *Petit* cured one Patient under ſuch a Difficulty of ejecting Seed, by making an Inciſion ſuch as is commonly made for the great Operation for the Stone. *Ibid.*

Mr. *De la Peyronie* remarks, that the hard Knots which form ſometimes in the *Corpus cavernoſum Urethræ* after venereal Virulency, are very difficult to cure. Till the pocky Matter is all got out of the Blood, it is in vain to attempt the Cure of theſe Knots; and, even after the venereal Taint is gone, theſe Knots don't yield to Mercury in any Shape, but are reſolved by *Douches* of the Waters of *Bareges*. *Ibid.*

Mr. *Puzos* recommends much the natural Delivery rather than the forced one for Women who have a Flooding when with Child. His Method with which he has had great Succeſs in ſuch Caſes, is, to let Blood, to order Reſt, and a cooling Diet. Theſe Medicines, he ſays, generally ſtop the Hæmorrhagy, which happens in the firſt Months of Geſtation.—If the Flow of Blood continues, he dilates the *Os uteri* gently with his Fingers, and breaks through the Membranes of the *Secundines*, to let the Waters out

as

as ſoon as he can. Immediately after this the Pains commonly become briſk; and the Contraction of the Womb ſtops the Blooding. In ſome few Caſes, where he judges that the Patient would loſe too much Blood, by waiting the natural Delivery, he forces away the Child. *Ibid.*

Mr. *Le Cat* gives the Deſcription and Figures of an *Ambi*, which he has contrived, free of the Faults which *Hippocrates*'s *Ambi* has. We cannot repreſent this Machine in an abridged Deſcription, eſpecially without a Picture; and therefore muſt refer to *Philoſoph. Tranſact.* Num. 469. § 2.

A Man whoſe Arm with the *Scapula* was torn off by a Mill, cured without any Hæmorrhagy. *Philoſoph. Tranſact.* Numb. 449. § 5.

Two Examples of the *Tendo Achillis*, which had been cut through, being cured without ſtitching. *Commerc. Norimb.* 1740. *Hebd.* 46.

M. *De la Faye*, who is Author of the Notes added to the third Edition of *Dionis ſur les operations de Chirurg.* mentions ſome Improvements that are not commonly taken notice of.

P. 4. It is a common Objection to ſtitching Wounds of the *Thorax*, that its Motion is conſtant and neceſſary. Mr. *De la Faye* obſerves, that the moſt conſiderable Muſcles ſituated on the *Thorax* are not employed in its Motions; and therefore are in as little Danger of tearing a Stitch as any other Muſcles: Beſides, ſays he, the Motion is not a ſufficient Objection, otherwiſe the *Abdomen* would not be ordered to be ſtitched when wounded.

P. 26. He remarks, that ſometimes in a Palſy of the Coats of the urinary Bladder, the Bladder

is

is raiſed into a Tumor above the *Oſſa Pubis*; which he warns Surgeons not to miſtake for an Abſceſs. The ſame Caution is alſo neceſſary, when the Gall-bladder is diſtended much with its Contents, and appears prominent below the Edges of the Cartilages of the Ribs.

P. 31. In Inflammations of the *Urethra* and Neck of the Bladder, when there is a Neceſſity of ſounding the Patient to let out the Urine, Mr. *De la Faye* approves of Mr. *Petit*'s hollow Catheter; which ſo far differs from the common one, that it is open only at the Extremity; which can be ſhut, by drawing backward a ſmall pyramidal Button at the Extremity of the Wire. He alledges that the ſwelled Membrane of the *Urethra* forces itſelf into the Openings at the Sides of the *common Catheter* near its Point, and is fixed ſo firmly in them, that the *Catheter* cannot be taken out, after it is introduced, without much Pain, Hæmorrhagy, and Increaſe of the Inflammation. He adviſes the *Catheter* employed in ſuch a Caſe, not to be near ſo crooked as it is commonly made, that it may be more eaſily introduced.

P. 54. It is a general Direction given by the Writers of chirurgical Operations, that when the Operation for a *Hernia* is performed, where the *Viſcera* are grown to the containing Parts, the Bowels ſhould be diſſected away and reduced. Mr. *De la Faye* adviſes rather to let the Bowels remain, and only to remove the Cauſe of Strangulation, when the Coheſion is intimate. He gives Examples of the Succeſs of this Practice. In ſuch Caſes eſpecially the Surgeon ought to examine whether any Part of the Inteſtine

Inteſtine lately fallen down, and not cohering, is engaged in the Ring of the Muſcles, and to take care to reduce it.

P. 58. He relates Hiſtories of great Pieces of gangrened Guts taken away; after which, the Extremities, being kept together by a Ligature, united.

P. 70. Mr. *Gerard* having tied a Doſſil in the Middle of a Thread, which he put round a Rib, where the intercoſtal Artery had been wounded; and having applied the Doſſil upon the Artery, he tied the two Ends of the Thread on a Compreſs placed on the Outſide of the Rib; and thus ſtopped the Hæmorrhagy.

P. 102. Mr. *Morand*, he tells us, extirpated a *Polypus* of the Noſe, with one Finger in the Noſtril, while he introduced another Finger by the Mouth above the Palate, and with the two Fingers ſeparated the *Polypus*.

Mr. *Sharp* (*Operations of Surgery*, Chap. 9.) ſeems to diſſuade Surgeons from making any large Opening into the *Tunica vaginalis* of the Teſticle, for the Cure of a *Hydrocele*. He mentions three Patients of his, who had near loſt their Lives after ſuch an Operation. Very violent Tenſion and Inflammation were brought on another, by injecting an Ounce of Spirit of Wine at the Puncture by which the Water of a *Hydrocele* had been evacuated.

Chap. 10. He affirms, that all Indurations of the glandular Part of the Teſticle, not tending to Inflammation and Abſceſſes, generally, if not always, lead on to *Schirrhus*; whereas thoſe Tumors of the *Epidydimis* ſeldom or never do ſo.

Chap. 24. He condemns the Operation of the

Empyema, for evacuating Blood or *Pus*; but allows it for voiding Water; and then would have the Opening made between the fifth and ſixth Ribs, and half-way between the *Vertebræ* and *Sternum*.

Chap. 27. Mr. *Sharp* adviſes always to cut away an oval Part of the Scalp, in order to examine whether or not the Skull is fractured, rather then to make a crucial Inciſion, as is commonly directed: for, ſays he, if the *Trepan* muſt be performed, the Teguments muſt be cut away; and, ifthat Operation is not neceſſary, theſe contuſed Teguments ſerve only to keep in the Matter, and to corrupt the Bone.

Ibid. He prefers the *Trefine* to the *Trepan*; becauſe, in his Opinion, the *Trepan* is more unhandy, and there is greater Convenience of holding the *Trefine*, and leaning on one ſide or other of the Saw. He would have the Heads of the *Trefine* to be made of a cylindrical Form inſtead of the conical; which was once thought a great Improvement, to prevent any Chance of the Inſtrument plunging in upon the *Dura Mater* and Brain. His Reaſon for preferring the cylindrical Form is, That leſs Force and Time are required to perforate the Bone with it, than with the conical.

Chap. 32. Mr. *Cheſelden* deſtroys ſwelled *Amygdalæ*, by tying Ligatures round their Baſe; which he does, either by putting a ſingle Thread round the Baſe with a Knot, which he draws tight, by keeping one End of it firm in the *Fauces* on a Ring on the End of a *Stilet*, while he draws the other with his Fingers; or with a Needle, the Eye of which is near the Point, and having

having two Threads in it, he perforates a very large *Amygdala* in the Middle, making a Ligature on each Half with each Thread. Mr. *Sharp* ſays, he has extirpated Hæmorrhoids this Way.

We have at laſt a compleat Body of Surgery, in Mr. *Heiſter's Inſtitutiones Chirurgicæ*; where all the different Parts of Surgery are fully treated, and little is omitted that has been hitherto wrote on that Art.

To point out the Uſe which might be made of a continued and regular Series of Obſervations of the Changes in our Atmoſphere, and of the Diſeaſes in the different Seaſons; and to ſhew the Advantage which might be reaſonably expected from them, we ſhall copy the *Aphoriſms* which Dr. *Hilary*'s Friend has collected from the Doctor's Obſervations of that kind. (*Appendix tacked to his Treatiſe on the Small-pox.*)

1. *Continued warm dry Seaſons* are productive of inflammatory Diſeaſes; in which the Head is chiefly affected. Maniac, and melancholy or hypochondriac Affections are likewiſe more frequent after ſuch Seaſons.

2. *Continued cold and dry Seaſons* are productive of inflammatory Diſeaſes; in which the Head is ſometimes, but more frequently the Bowels, are affected.

3. In *warm moiſt Weather*, epidemical Diſeaſes are gentle and moderate, and Perſons are diſpoſed to ſlow continual Fevers, with little Heat or Thirſt. This Conſtitution likewiſe takes off Diſeaſes which owe their Riſe to a *cold dry Seaſon*.

4. *Continued cold and moiſt Seaſons* produce Diſeaſes attended with ſerous Defluxions and Inflammations of the glandular Parts, Quinſies,

Catarrhs, Fevers, *Aſthmas*, *Peripneumonies*, *Diarrhœas*, with remitting and violent intermitting Fevers, Apoplexies, and Palſies.

5. Fevers cauſed by ſuch a Conſtitution of the Air, for the moſt part are attended with *Stupors*, frequent ſymptomatical Diſcharges by Stool, partial and univerſal Sweats, (but without any Relief), rendering the Habit infirm and obnoxious to long Intermittents, and tedious chronical Diſorders.

6. A Change from *hot* and *dry* to *cold* and *moiſt*, puts an End to thoſe Diſorders which proceed from the firſt mentioned State of the Weather, or changes their Appearance in proportion to the Quickneſs in which they ſucceed each other: Violent inflammatory Fevers are now alſo frequent, chiefly affecting the membranous Parts, as the *Larynx*, *Pleura*, Lungs, Stomach, and the membranous Coverings of the Joints, occaſioning *Pleuriſy*, *Rheumatiſm*, &c.

7. When a *hot* and *dry Seaſon* ſucceeds a *cold* and *moiſt* one, if the Change is gradual, it takes off the Diſeaſes produced by the preceeding Conſtitution, and occaſions Intermittents; but if it is ſudden, it renders thoſe Diſtempers malignant. The *Small-pox* in ſuch a Conſtitution moſtly become of a worſe kind.

The Year 1731 was a very dry Seaſon about *Paris*; during which, Dryneſs of the Mouth, Sickneſs, *Nauſea*, Diſorders in the Throat, ſeveral of which were Quinſies, different Fluxions to the Head, and ſeveral ſorts of irregular obſtinate Fevers were very frequent at *Paris*. Mr. *Juſſieu*, obſerving thoſe who drank the Water of the *Seine* to be generally attacked with theſe Diſorders,

Diſorders, examined the Water of that River, and of the *Marne*, and found them bitter and acrid to the Taſte; which, he thinks, was owing to the more than ordinary Quantity of *Hippurus* and *Conferva* propagated that Year in thoſe Rivers, and their Sources; and corrupting there, while there was a leſs Quantity of Water to dilute the Tincture taken from them, which cauſed the Diſeaſes above mentioned. *Memoires de l'Acad. des Sciences*, 1733.

Dr. *Huxham* (*Obſervationes de aere & morbis epidemicis*, &c.) not only mentions the Method of treating the ſeveral *epidemic* Diſtempers which prevailed, during the nine Years of his Obſervations, but in his Notes enters into the general *rationale* and Cure of ſeveral; where there are many good practical Hints. We ſhall tranſcribe ſome of them.

P. 25. To thoſe who were recovering from obſtinate intermitting Fevers, he preſcribed the *cold Bath* as a Strengthener, to prevent a Return of the Diſeaſe; and it was very ſucceſsful.

P. 64. Expectoration is to be promoted in the *Peripneumony*; but is not to be expected in a genuine *Pleuriſy*, in which common Pectorals are of no more Uſe than in an Inflammation of the Leg.

P. 66. In the *Kinkcough* he uſes the common Evacuations, and propoſes to correct the *Lentor* of the Blood, and to ſtrengthen the Nerves and Stomach, by Mercurials, *Cortex Peruvianus*, and proper Stomachics.

P. 141. He recommends much ſmall Doſes of emetic Wine, as a Deobſtruent and Sudorific in-

ſlow Fevers, in many chronical Diſeaſes, and eſpecially in an obſtinate Rheumatiſm.

P. 145. He has thouſands of times experienced the good Effects of *Tartarus regeneratus* in the Cure of Obſtructions of the Bowels, and for ſluggiſh Humors; but propoſes a more penetrating Medicine, to wit, *Salt of Hartſhorn*, ſaturated with *Spirit of Vinegar*; which not only takes away the fetid Smell of the Oil of the Salt, but changes it into an agreeable Aromatic.

We regrete that we cannot bring what he has ſaid on *ſlow nervous Fevers* and the *Colick of Devonſhire*, into a ſmall enough Space to be inſerted here.

Dr. *Cheyne* (*Rational Method of curing Diſeaſes*) recommends *Milk* and *Seed-diet* with Water for Drink, as the ſureſt Preſervative againſt Diſeaſes, and Cure of them. Among other Examples of the Efficacy of this Diet, he ſays, (*p.* 150. 263.), that a total Aſs-milk Diet (about two Quarts a-day, without any other Food or Drink) will in Time cure a Cancer; and when to the Milk and Seed-diet ſome of the proper Medicines for the ſeveral Diſtempers are joined, Cure may be made (*p.* 264.) of beginning Conſumptions, (*p.* 265.) *Hemiplegia*, or dead Palſy, (*p.* 267.) *Gonorrhæa* and Pox, (*p.* 268.) an habitual *Aſthma*, (*p.* 269.) Hæmorrhagies, (*p.* 270.) Leproſy, *&c.*

Water or *Sherbet* made of Juice of Oranges and a little Honey, is, according to Dr. *Cheyne*, (*p.* 172.), the beſt Drink in a Dropſy. (*P.* 173.) An *Anaſarca* may be cured by Exerciſe and drinking Water. (*P.* 123.) He prefers plain liquid Quickſilver, *Æthiops*, *Mercurius alcaliſatus*.

tus or *Cinabar*, to all other Preparations of *Mercury*; and in theſe Forms it is a favourite Medicine with him.

Dr. *Martin* (in *one of his Eſſays*) defends the Antients in the Rules they laid down concerning the *Periods* and *Criſes* of Diſeaſes, endeavouring to prove that they are founded on accurate Obſervations.

An hydropic Body became ſo infectious, that the Surgeon who tapped the Corpſe was thrown into a peſtilential Fever. *Philoſoph. Tranſact.* Num. 454. § 4.

The *Indians* in *America* have a very ſubtile Poiſon which they make uſe of ſometimes. Dr. *Burgeſs* ſays, the Antidote to this is the Root of the ſenſitive Weed, *Herba ſenſitiva*, of which a Handful is boiled in three Quarts of Water. The Doſe of this Decoction is a Glaſsful every Hour. *Philoſoph. Tranſact.* Num. 462. § 2.

Dr. *Maſnechelli* tells us, that in the Plague among the Cattle in *Italy* in 1735, Rue, Wormwood, Garlick, and ſuch other ſtrong ſmelling Plants hung about their Noſes and Mouths, were eſteemed Preſervatives againſt the Infection. Nitrous Medicines, Gun-powder, Sulphur, and the ſharper Aromaticks given to the Cattle, did Hurt. Bleeding, crude Antimony with Setons, and a Diet of the moſt mild ſoftening Herbs, did Service.

Dr. *De Sault* (in his Treatiſe on the *Rabies Canina*) argues for the *Rabies* depending on ſmall Worms; of which, he ſays, there are a great Number found in the Heads of thoſe who die of this Diſeaſe. From the Analogy of this terrible Diſeaſe with others, ſuch as the *Itch*, *Lues venerea*,

nerea, &c. which, in his Opinion, are alſo contagious, by *Worms* communicated from one Perſon to another, he was led to think that the Cure of the *Rabies* was only to be performed by *Mercury*; and the Succeſs confirmed his Theory: For of four Men who had all been bit at the ſame time by the ſame Wolf, two were treated by the common Specifics of plunging in the Sea, *&c.* and died ſome Days after of the *Rabies*. The other two, having all the Signs of an approaching *Rabies*, were cured by Mr. *De Sault*'s Method; which is this.—If he is conſulted immediately after the Perſon is bit, he orders him to be bathed in the Sea, that the common Confidence in this Remedy may calm his Mind. As ſoon as the Patient returns, the Doctor puts him on the Uſe of *Palmarius*'s Powder compoſed of *Fol. Rut. Verben. Salv. Plantag. Polypod. Abſinth. vulg. Menth. Artemiſ. Meliſſ. Betonic. Hyperic. Centaur. min. a. partes æquales*, with ſome *Coralline*. A *Drachm* of this Powder is to be taken every Morning in a Glaſs of white Wine or warm Water. This he gives twenty or thirty Days, as there is more or leſs Preſumption of the Poiſon having entered the Blood. From the firſt Day of taking the Powder, he rubs a *Drachm*, or two of *Ung. Neapolit.* upon the Wound and Skin round it every other Day. After doing this thrice, he applies the Ointment every third Day, and afterwards every fourth Day, till he has made uſe of two or three Ounces of the Ointment.—If the Patient has delayed ſeveral Days to take his Advice, he uſes the mercurial Friction three or four Times a-day, for four Days, and increaſes the Doſe of *Palmarius*'s

rius's Powder; then forbears the Inunction two Days, leſt a Salivation be brought on.—Our Author likewiſe recommends Muſic, as of uſe to calm the Mind, and divert the Fear which People in danger of this Diſeaſe generally have.

Dr. *James* relates the Cure he made of Dogs that were mad, and how he preſerved others from the *Rabies*, who had been bit by mad Dogs, by giving Doſes of *Turbeth Mineral* every Day, or every other Day. The other Dogs of the Pack that had been bit, died, notwithſtanding the famous *Peuter Medicine*, dipping in the Sea, and the other common Specifics.—The Doctor likewiſe mentions three People who were bit by mad Dogs, and eſcaped the *Rabies* by the Uſe of the *Turbeth*. *Philoſoph. Tranſact.* Num. 441. § 8.

Mr. *Fuller* relates the good Effects of the *Pulv. Antyliſſus* compoſed of *Lichen. ciner. terreſt. & Piper nigr. aa.* in preventing the *Rabies*. *Philoſoph. Tranſact.* Num. 448. § 5.

A Perſon who had been bit by a mad Dog, and began to have Symptoms of the *Rabies*, was ſaved, by having 120 Ounces of Blood taken in a Week, and being bathed in cold Water, by Mr. *Hartley* and Mr. *Sandys*. *Philoſoph. Tranſact.* Num. 448. § 6.

Mr. *Nourſe* relates the Hiſtory of a Lad bit in the Thumb by a mad Dog. He took Morning and Evening a *Drachm* of the *Pulv. Antyliſſ.* forty Days, and bathed in the Sea ten Days; he was cut for the Stone ſoon after, and recovered very well; nineteen Months after which he died, with all the Symptoms of the *Hydrophobia*. *Philoſoph. Tranſact.* Num. 445. § 2.

Vinegar

Vinegar is recommended by Dr. *Kramer* as a Specific againſt the *Hydrophobia*, eſpecially if ſome Powder of *Cantharides* is mixed with it. The Receipt given him was to boil from four to ten Grains of the fine Powder of *Cantharides*, in an Ounce and a half, or two Ounces of the beſt *Vinegar*; which is to be given warm to the Patient. *Commerc. Norimb.* 1735, *Hebd.* 11. § 3.

For the Cure of the *Lues venerea*, Dr. *De Sault* (in his Treatiſe on this Diſeaſe) recommends frequent Frictions of large Quantities of mercurial Ointment made with one third of Quickſilver, to wit, from two or three *Drachms*, to an Ounce, or an Ounce and an half every Night, or every other Night; taking Care to keep the Belly in a purging Way, by Clyſters, Laxatives, or the ſtronger Purgatives, if the Mercury begins to affect the Mouth. He ſays this Method is ſure and altogether ſafe; and he relates ſeveral Hiſtories of Cures performed by this Method, not only in the *Lues venerea*, but in many other Diſeaſes; particularly in obſtructed hardened Glands, the Liver, *Teſtes*, &c.

Mr. *Douglas* (*Letter on the Cure of the* Lues venerea) commends greatly *De Sault*'s Method; and we are informed by private Letters, that it has been practiſed with Succeſs in ſome of the Hoſpitals in *London*.

Dr. *Werlhoff* prefers frequently repeated ſmall Doſes of Mercury to a Salivation, for the Cure of the *Lues venerea*. *Commerc. Norimb.* 1735, *Hebd.* 13. § 4.

Dr. *De Sault* (*Diſſertation on the Gout*) being of opinion, that the *Gout* depends on want of Perſpiration, propoſes warm Baths, Exerciſe, keeping

keeping always and defending from Cold, clean Cloaths, moderate eating, abſtaining from Supper, Tranquillity of Mind, Friction and Milk-diet, as Preſervatives from it. *Garlick* being obſerved by *Sanctorius* to increaſe Perſpiration, is recommended; as are *Cortex Peruvianus* and *Steel* in Winter.—When the Stomach is attacked, he lets Blood at the Ancles, and applies Epiſpaſtics of different kinds to the Feet, and then endeavours to procure a general Sweat.—When the Pain is very violent, he blunts it, by applying a Cloth dipped in *liquid Laudanum* to the pained Part, and exhorts the Patient to uſe Exerciſe after this.

Dr. *Buddeus* endeavours to prove, that the preternatural Oſſifications which are commonly ſaid to be formed in different Parts of the Body, do not deſerve that Name; for that theſe hard Subſtances have ſcarce any other Properties of Bone, except the Whiteneſs and Hardneſs. *Miſcellan. Berolin.* Tom. 5. Pars 2. § 1.

Dr. *Schlichting* affirms, that the *Spina ventoſa* is cured by rubbing the Tumor twice a-day with *Ung. Neapolit.* preventing Salivation by gentle Cathartics. *Philoſoph. Tranſact.* Num. 466. § 10.

Mr. *Petit* ſays, the true *Aneuriſm*, which he calls *Aneuriſm by Dilatation*, contains fluid Blood, yields to Preſſure, and the Noiſe of the Liquor ruſhing into it may be heard; whereas in the *Baſtard* kind, which he calls *Aneuriſm by Effuſion*, the Blood is coagulated, and therefore cannot be made to return into the Veſſel, nor can any Sound be heard. *Memoires de l'Acad. des Sciences*, 1736.

Mr. *Du Vernoy* deſcribes an aneuriſmal Sac ſituated

tuated on the third to the ſixth *Vertebra* of the *Thorax*; which, he ſays, was the *Aorta* dilated into a Sac ſix Inches and a half wide, and as many Inches long. Its Coats had a great many bony *Laminæ* in them, and were raiſed into unequal Protuberances. The poſterior Part of this Sac adhered ſo firmly to the carious Bodies of the *Vertebræ*, that it was impoſſible to ſeparate them; and three large Depreſſions were made ſo deep into the *Vertebræ*, as to be within a Line or two of the Cavity for the *Medulla ſpinalis*. He ſeems to think the *Aneuriſm* was owing to the *Caries* of the Bones, by which the Support which Arteries, according to him, generally have on ſome one Side was taken away. The Man who had this *Aneuriſm* was plump, well coloured, and in appearance healthy.

Mr. *Du Vernoy* has mentioned alſo more Ligaments of the *Vertebræ* of the Back, than are commonly deſcribed. *Comment. Acad. Petropolit.* Tom. 6.

A Man in an inflammatory Fever, being let eight Ounces of Blood in a Morning faſting, Dr. *Stewart* poured off from the *Coagulum* four Ounces of a white Liquor reſembling Milk, which had no Smell at firſt, but became very putrid with the Smell of rotten Eggs; whereas Chyle or Milk turns ſour and coagulates. Few Days after, the Man being again blooded when he was free of the Fever, the *Serum* was clear in the common Way. *Philoſoph. Tranſact.* Num. 442. § 9.

Dr. *Hilary* (*Treatiſe on Small-pox*) obſerves, *p.* 52. that in the *Delirium*, which ſometimes comes on in the fourth or fifth Day after the Eruption

ruption of the *Small-pox*, one will ſee the Bottom of the Eye of a ſparkling fiery red Colour; which is a dreadful Symptom.

P. 58. He recommends the Preparation of thoſe who have not had the *Diſeaſe*, to be made by antiphlogiſtic Purgatives, ſmall Doſes of Mercury, and low cooling Diet; and ſays, *p.* 61. that he always obſerved the Diſeaſe more mild and favourable, the Symptoms more moderate, and the Puſtules fewer, the longer this Method was continued before the Perſon was infected; nor did he ever ſee the *confluent Small-pox* follow the Uſe of this Method, even when the Perſons were infected by thoſe who had the *confluent* kind, and though they were of Families where this Diſeaſe had frequently been fatal.

Our Author recommends Blood-letting in all the *Stadia* of the *Small-pox*, when the Fever becomes high, or other Symptoms indicate it; and generally he orders the *cool Regimen* through the Courſe of the Diſeaſe, remarking when this Management ought to be changed.

P. 141. He argues for the Poſſibility of preventing the Diſeaſe altogether, by treating it, according to *Boerhaave*'s Propoſal, in the ſame way as any other inflammatory Diſeaſe.

Dr. *Martin* of *Lauſanne* recommends bathing the Face and Body with Cloths dipped in tepid Water every four Hours during the Eruption of the *Small-pox*, aſſuring that this has excellent good Effects. *Hiſt. de l' Acad. des Sciences*, 1737.

Dr. *Haller* tells us, that *Camphire* aſſiſts greatly to fill the Puſtules of the *Small-pox* of the

confluent kind, with *Petechiæ*. *Commerc. Norimb.* 1736, *Hebd.* 10. § 1.

The *Quartan Ague* is ſaid to be cured by a Medicine compoſed of *Euphorbium*, *Reſine of Jallap*, *Merc. dulc.* and *Sugar*. *Commerc. Norimb.* 1739. *Hebd.* 42.

Dr. *Michelotti* relates the Cure of a young Man who, after being expoſed to very hot Weather at Sea, and having committed violent Debauches in drinking, became mad, without any Fever. He was cured by violent blooding, ſtarving, weak very cold Drink, the cold Bath, and pouring cold Water on his Head. *Hiſtoir. de l'Acad. des Sciences*, 1734.

A Woman with Child cured of a violent *Vertigo*, by ſmoking Tobacco. *Commerc. Norimb.* 1737. *Hebd.* 4. § 3.

A Lady who had an extraordinary paralytic Diſorder of her Eye-lids, which ſhut every Night about ſix o'Clock, with a running of white Matter, and which remained ſo till next Morning, was cured in few Days, by having the Waters of *Balleruc* near *Montpelier* pumped on her Neck, and the back Part of her Head. *Philoſoph. Tranſact.* Num. 449. § 4.

A Woman had a ſurpriſing *Catalepſy*, her Members keeping all the Poſtures they were put into, as if ſhe had been made of Wax. *Hiſt. de l'Acad. des Sciences*, 1738.

Mr. *Maloet* relates the Hiſtory of a Man, who for three Years had a violent Pain at the lower Part of the Forehead, towards the left Side, and near the Root of the Noſe. It was ſometimes more violent than ordinary, and ſhooted ſo to the Eye of that ſame Side, that he thought he would

would have loſt his Eye. He had a conſiderable buzzing Noiſe in his Ear. To relieve this laſt Symptom, he poured daily ſome Drops of *Oil of Almonds* into his Ear for ſome Days, lying on his oppoſite Side ſome time after dropping in the Oil. Two Days after beginning the Uſe of the Oil, he was ſenſible of an Itching and Stinging in the Noſe, with an Inclination to ſneeze; and at laſt he felt ſomething moving within his Noſtril; which he brought away with his Finger. It was a *Worm* of the *centiped* kind, about an Inch and a half long, which run ſwiftly when laid on his Hand. It lived five or ſix Days among Tobacco in a Box. The Patient was free of his Pain ever after.——Mr. *Littre* told ſuch another Caſe in 1708, of a larger *Centiped* voided at the Noſe, after it had thrown the Woman, in whoſe *frontal Sinus* it was, into Convulſions, and had almoſt taken away her Reaſon from her. Mr. *Littre* attributed its coming away to her ſnuffing Tobacco for ſome time; whereas Mr. *Maloet*'s one lived among Tobacco, and the Man had been in uſe to ſnuff it. *Hiſt. de l'Acad. des Sciences*, 1733.

Mr. *Demours* (*Diſſertation ſur les maladies des yeux*) accounts for the *Mydriaſis* or Dilatation of the Pupil, where Objects appear too little, from the Dilatation of the Veſſels of the *Iris*, which compreſs the ciliary Nerves; and theſe again affect the exterior Fibres of the optic Nerve, ſo as to make them unfit to convey the Impreſſions of the Rays which fall upon them; ſo that the ſenſible Part of the Bottom of the Eye being reduced to a ſmall Surface, the Pictures of the viſible Objects muſt be ſhortened, and the viſual

Angle, by the Largeneſs of which we judge of the Magnitude of Objects, muſt be diminiſhed; and therefore, ſays he, notwithſtanding the Dilatation of the Pupil, Objects will appear leſs.—That it may not be thought that the Diminution of the ſenſible Surface of the Bottom of the Eye would only make the Perſon loſe the Sight of Part of the Object, Mr. *Demours* endeavours to ſhew, that, in the *Mydriaſis*, the Rays coming from the ſeveral Points of Objects, are not collected regularly into Points again in the Bottom of the Eye; as, ſays he, is evident from the confuſed Viſion which ſuch People have of all Objects; and therefore the neareſt of theſe ſcattered Rays may fall on what remains ſenſible, and there form a whole, but a leſs and more confuſed Picture than in a ſound Eye.

When the Tears are ſharp, he propoſes that the Patient ſhould always ſleep lying on the Side oppoſite to the affected Eye, that the Tears may ſooner paſs off by the *Puncta lacrymalia*, and thereby may have leſs Chance of eroding the *Cornea*, and of making a long tranſverſe Cicatrix on that Coat.

He recommends the *Cruſt of Sugar*, in which there is more Oil than in refined Sugar, as a good Ingredient in *Collyria*, for deterging Ulcers of the *Cornea*, in which Aſtringents are hurtful.

When the aqueous Humor of the Eye is evacuated at a Wound or Ulcer of the *Cornea*, there is Danger of the *Iris* growing to the *Cornea*; which afterwards may prove very uneaſy, by too much Light offending the Eye. To prevent this Adheſion, Mr. *Demours* propoſes to expoſe the Patient to Light from time to time, till the *Cor-*

nea

nea is again raiſed by the aqueous Humor; for the Light occaſions a Motion in the *Iris*, which may prevent the Concretion of the *Iris* to the *Cornea*.

Dr. *May* having diſſected two Eyes of the ſame Perſon which had been couched for Cataracts, ſaw the opaque depreſſed *Cryſtalline* in the one, *that* which had recovered Sight; but in the other he could obſerve only an opaque Membrane, which he believed to be the *Capſula* of the *Cryſtalline*, which had been puſhed out before it was ripe. *Commerc. Norimb.* 1733, *Hebd.* 4. § 3.

Dr. *Agricola* likewiſe diſſected two cataractous Eyes of the ſame Perſon. One of them which was judged to be ripe, had no Adheſions of the *Capſula* of the opaque *Cryſtalline*, and was depreſſed very eaſily. The other required a conſiderable Force, the *Iris* being ſtretched different Ways, and Part of the black *Pigmentum* of the *choroid* Coat was ſeparated before it was removed out of its Place. The *Capſula* of the *Cryſtalline* was tranſparent in both. In the ripe Eye purulent-like Matter was every where interpoſed between the opaque *Cryſtalline*, and its *Capſula*. The *Cryſtalline* divided into *Lamellæ*. The purulent Matter and hardened *Cryſtalline* were both heavier than Water, for they ſank in it; but the *Capſula* ſwimmed. *Commerc. Norimb.* 1735, *Hebd.* 18.

No Water was found in either Stomach or Lungs of drowned Whelps. *Medic. Sileſiac. Satyr.* Spec. 2. Obſ. 2.

A Girl remained a Quarter of an Hour under

Water, without being drowned. *Philoſoph. Tranſact.* Num. 454. § 3.

Dr. *Burton* (*Eſſay on Chincough*, tacked to his Treatiſe on the *Non-naturals*) declares againſt Bleeding, Vomiting, and Purging, in the *Kinkcough*, except in very urgent Caſes. The Medicine which, he ſays, has had great Succeſs, is a *Scruple* of fine Powder of *Cantharides*, and as much *Camphire*, mixed with three Drachms of the *Extract of Jeſuits Bark*. Of this Mixture he gives eight or nine Grains to Children, every third or fourth Hour, in a Spoonful of ſome ſimple Water, or ſome Julap, in which a little *Balſ. Copaib.* had been diſſolved. He ſays this Method is not proper in ſuch *Kinkcoughs* as proceed from thin ſharp Rheum; but he believes, that, in the Kinkcough from a tough viſcid Phlegm, it will ſcarce ever fail, at leaſt it has not failed yet.

Dr. *Hoyer* informs us, that a moſt violent *Hiccough*, which had reſiſted a great Variety of Medicines, was at laſt cured by ſucking Womens Milk. *Act. Acad. Nat. curioſ. Vol.* 4. *Obſ.* 33.

A particular Example is related to confirm the general Prognoſis which ſome have made of a *Pleuriſy* being deadly, when purple Spots ſupervene upon it. *Medic. Sileſiac. Satyr.* Spec. 2. Obſ. 7.

Mr. *De Sault* (*Diſſert. ſur la Phthiſie*) endeavours to prove, that a Conſumption of the Lungs always depends on Tubercles; and that an Ulcer there, is only an Effect of theſe Tubercles; and, when the Diſeaſe is in its laſt *Stadium* and incurable, and then only, becomes contagious, by ſmall Worms which it communicates to others.

The

The Cure which our Author propoſes for the Conſumption, before it comes to the laſt Stage, is, to reſolve the Tubercles with *Mercury*, *Steel*, *Millepedes*, and the aperient and antiſcorbutic Plants. He remarks, that the Liver is generally hard in this Diſeaſe; and therefore he applies a warm mercurial Plaiſter on the right hypochondriac Region, rubbing ſome mercurial Ointment every Night on the Skin of that Part; then continues in the Uſe of Tablets made with *Steel*, *Millepedes*, *Benzoin*, *Coral*, and *Crabs Eyes*, of each half an Ounce, *Cinnamon* three *Drachms*, *Sugar* half a Pound; mix all with the Mucilage of *Gum Tragacanth* made with Orange-flower Water. The Doſe of theſe Tablets is two *Drachms* Morning and Evening, waſhing it down with a Ptizan made of the Roots of Nettles, two Ounces of the Juice of Water-creſſes, and as much Juice of Cervill. He ſays, this Method, with riding, has often been ſucceſsful.

Dr. *Kramer* obſerves, that all Boys, at the Time of Puberty, between twelve and fourteen Years of Age, complain of Uneaſineſs in their Breaſts; which are ſwelled and itchy, the *Nipples* and *Areolæ* round them inflaming with Pain, ſometimes Excoriation and Exulceration of ſome of the lactiferous Ducts. The beſt Remedy for which, he ſays, is, to preſs out the white *Serum* then contained in them; after which they cure with a Bit of Plaiſter. *Commerc. Norimb.* 1735, *Hebd.* 30. § 2.

Mr. *Lieutaud* found the *Gall-bladder* of a human Body contracted greatly, with its Orifice blocked up by a black bilious Concretion; the larger Extremity of which was lodged in a Sac formed

formed between the Membranes of the *Gall-bladder*, in which a clear watery Liquor was contained; and as its Sides were white, he thinks it probable, that no Bile had ever been in it. The *hepatic* and *cyſtic* Ducts were greatly dilated, and full of Bile; from which he concludes, that the *cyſtic Bile* is not ſecerned in the Coats of the Gall-bladder, nor conveyed into it by *Hepato-cyſtic* Ducts. *Hiſt. de l' Acad. des Sciences*, 1735.

Mr. *Du Vernoy* mentions Tumors of different Figures ſtanding out from both the external and internal Surface of the Inteſtines. They were clear, tranſparent, containing nothing but Air, and very different from what *Ruyſch* mentions. *Comment. Acad. Petropolit. Tom.* 5.

Dr. *Kilbner* tells us of two people who were cured of an epidemic *Dyſentery*, by a violent Drubbing. *Act. Acad. Nat. curioſ. Vol.* 4. *Obſ.* 113.

Dr. *Wolf* relates the Caſe of a Woman with Child, who was ſeized with a total Suppreſſion of Urine, by the Womb falling down, and preſſing on the *Urethra*. *Act. Acad. Nat. curioſ. Vol.* 4. *Obſ.* 20.

Dr. *De Sault* (*Diſſert. ſur la Pierre*) is very poſitive, that the hot ſulphureous Waters of *Barege* would diſſolve a Stone in the Bladder, if they were drank long, and in large Quantities; were injected into the Bladder, as Mr. *Hales* propoſes; (See our *Vol.* II. *p.*336.) were given in the Form of Clyſter, and were let fall on the hypogaſtric Region.

Mrs. *Stephens* having ſold Medicines for the Stone in the Bladder or Kidneys ſome time, Dr. *Hartley*

Hartley publiſhed ſeveral Caſes of their Succeſs: And ſo much was ſaid of them, that the Parliament appointed Truſtees to examine into the Truth of what was alledged in her Favour; the Report of theſe Truſtees being favourable, ſhe had Five thouſand Pounds *Sterling* ordered for publiſhing the following Receipt.

Her Medicines are a *Powder*, a *Decoction*, and *Pills*. The *Powder* is ſix Parts of fine Powder of *Hen Egg-ſhells* calcined till they become of a greyiſh white Colour, and of an acrid ſalt Taſte; then left two Months in an open Veſſel, till what is ſufficiently calcined falls into a fine Powder, to be ſeparated from the groſſer Parts, by paſſing it through a Hair-ſieve. To this Egg-ſhell Lime, add one ſixth Part of Powder of *Snails*, with their Shells burnt in a Crucible, till they have done ſmoking.—A *Drachm* of this Powder is to be taken thrice a-day, in a large Tea-cup full of White-wine, Cyder, or ſmall Punch; and half a Pint of the Decoction is to be drank after each Doſe.—If the Patient has Pain, it is to be made milder by Opiats.—If he is coſtive, gentle laxatives are to be taken, and purging is to be reſtrained.—If the Powder is too ſtrong in the above Proportion of ſix Parts of the Powder of *Egg-ſhells* to one of *Snail-powder*, it is to be weakened by increaſing the Proportion of the *Snail-powder*.

To make the Decoction, ſhe prepared Balls compoſed of four Ounces and a half of the beſt *Alicant* Soap, a large Spoonful of the Powder of *Swines Creſſes* burnt to Blackneſs, and as much Honey as was neceſſary. She boiled one of theſe Balls ſliced with out green Camomile, or

Camomile-

Camomile-flowers, ſweet Fennel, Parſley, and Burdock-leaves, of each one Ounce, in two Quarts of Water, half an Hour; then ſtrained it off, and ſweetened it with Honey. When theſe Herbs are not to be had green, ſhe takes the ſame Quantity of their Roots cut and ſliced.

Thoſe whoſe Stomachs can't bear this Decoction, may take one ſixth Part of the Ball formed into Pills, with every Doſe of the Powder.

The Pills are made, by taking equal Quantities, by Meaſure, of *Snails* calcined as before, of *wild Carrot-ſeeds*, *Burdock-ſeeds*, *Aſhen-keys*, *Hips*, and *Haws*, all burnt to Blackneſs, and reduced to a fine Powder. With a large Spoonful of this Powder, four Ounces of Soap, and as much Honey as is neceſſary, bring them to the Conſiſtence of Pills, of which ſixty are to be formed out of every Ounce of the Compoſition. In Fits of the Gravel, five of theſe Pills are taken every Hour when awake, till the Complaints are removed.

During the Uſe of theſe Medicines, the Patient ought to abſtain from ſalt Meats, red Wines, and Milk, drink few Liquors, and uſe little Exerciſe.

Dr. *Hartley*, (*Supplement to the View of the preſent Evidence*, &c.), leaving out the ſuperfluous Part of Mrs. *Stephens*'s Preſcription, reduces her Receipt to a more ſimple Form, to wit, to two and a half Ounces of *Soap*, and ſeven and a half Scruples of *Egg-ſhell Powder*, as the mean Doſe of the Medicines to be taken every Day.

Dr. *Hales*, (*Account of Experiments on Mrs. Stephens's Medicines*), after ſeveral Trials on the

the different Ingredients, found, that the dissolving Power of them lay in the Lime; which Dr. *Rutty* (*Account of new Experiments*) confirmed: And Dr. *Juryn*, having taken *Soap-lees*, the Ingredients of which are *Potashes* and *Lime*, beginning with few Drops, and increasing the Quantity, till he took an Ounce, or an Ounce and a half, every Day, in a proper Vehicle, was cured of bloody Urine, Pain, &c. and passed several small Stones; after which he had no Uneasiness. *See also our Vol.* V. *Art.* LXIX.

Dr. *Lobb* (*Treatise on Dissolvents of the Stone*) proposes to make the Cure of the Stone, by feeding only on those Foods which, he thinks, have most of the *Lithontriptic* Virtues; of which he has given us a List.

in 1738 published in ye News papers, an account of called ye Chronicles dissolving ye Stone by Lemon or other acids in Water

LXXIX. *A List of* Medical Books *published since the beginning of the Year* 1735.

A Circular invitatory Letter to all Orders of learned Men desiring Assistance in compiling a History of the several Branches of Physick, and of the *British* Writers on any of them, by *Ed. Milward*, M. D. 8*vo*, *Lond.* 1740.

De claris Bononiæ Anatomicis Oratio Jos. Ferdinandi Gulielmino, M. D. & P. 4*to* Bonon. 1737.

Jacobi Brucken *historia vitæ Adolphorum Occonum virorum clarissimorum, ad illustrandam rem literariam & medicam sæculi* XVI. *comparata*, 4*to*, *Lipsiæ*, 1735.

Alberti Schultens Oratio in memoriam *Hermanni Boerhaave*, 4to, Lugd. Bat. 1738.

Eloge historique de M. Maresshall *premier Chirurgien*

urgien du Roy, par M. Morand, 4to, *à Paris*, 1737.

Gottofr. Christ. Bothii *de nominibus vocabulisque, quibus medicos eorumque artem adpellârunt veteres Germani*, 8vo, Helmstad. 1735.

Assemblée publique de la Societé Royale des Sciences, tenue dans la grand salle de l'hôtel de ville de Montpelier, 4to, Montpelier, 1736.

Recueil de Lettres, Memoires, & autres pieces pour servir à l'histoire de l' Academie des Sciences & Belles Lettres de la ville de Besiers, 4to, à Besieres, 1736.

Exercitatio de principibus Diis artis medicæ tutelaribus apud veteres Græcos & Romanos. Autore Carolo Frederico Hundentmark, 4to, *Lipsiæ*, 1735.

Carol. Fred. Hundentmark *de incrementis artis medicæ per expositionem ægrotorum apud veteres in vias publicas & templa*, 4to, Lipsiæ, 1739.

Disquisitio medica & philologica de Variolis & Anthracibus, *ubi de utriusque affectûs antiquitatibus, signis, differentiis, medelis disserit*, Paul. Gottleib. Werlhoff, M. D. *Accedit* Rudolph. August. Behrens, M. D. *Dissertatio de affectionibus à comestis Mytulis*, 4to, Hanover, 1735.

Carbo pestilens á carbunculis sive variolis veterum distinctus delineante utrumque affectum, Joan. Goth. Hahn, M. D. *Accedunt binæ*, Dan. Wilhelm. Triller, *de eodem argumento epistolæ*, 4to, Wratislav. 1736.

De Schidia Cyrtonosi, quæ Glissonio *Rachitis est, epistola* Sigismundi & J. Goth. Hahn. 4to, Vratislav. 1735.

Wainwright

Wainwright on Non-naturals, 5th Edit. *Lond.* 1737.

A Treatise on the Non-naturals. To which is subjoined a short Essay on the Chincough, by *J. Burton*, M. D. 8vo, York, 1738.

Exercitatio Physico-medica de efficacia & usu aëris mechanico in corpore humano; cui annectuntur observationes medico-practicæ, 8vo, Amstelod. 1738.

Carl. Gottl. Rogiss, *M. D. Specimen de aqua salutari in forum medicum influxu & ferè optimo contra universos morbos præsidio*, 8vo, Vratislav. 1737.

Vera vini & aquæ constitutio physica in Franconia *imprimis civitatis* Suinfurti, *cum variis & rarioribus observationibus medicis, autore* Jo. Frid. Rabel, M. D. 4to, *Suinfurt.* 1737.

Traité des Eaux Minerales de Bourbonne les Bains, *par* M. Baudry *Medecin*, 8vo, à Paris, 1736.

Traité des Eaux minerales de Vichi *& sur la plupart des Eaux minerales de* France, *par* Jacques François Chomel. M. D. 12*mo à* Clermont Ferrand. 1738.

Breve Ragguaglio dellà natura e qualita dell' aqua nominata Volgo in Assisi di Mejano *di* Nic. Ant. Cattani, M. D. 4to, Assisi, 1737.

Jo. Dan Gohlii, *de fonte* Freyenwaldense *dissertatio*, 4to, Lipsi. 1735.

De aquis Brixianis *examen chymico-medicum, autore* Franc. Roncallo, 4to, Brixiæ, 1735.

An Essay on *Witham* Spa, by *J. Tavernier*, M. D. 8*vo*, *London*, 1737.

An Inquiry into the Virtues of the medicinal

Waters at *Briſtol*, by *P. Keir*, M. D. 8*vo*, *London*, 1739.

A new Analyſis of the *Briſtol* Waters, by *John Shebbre* Chymiſt, 8*vo*, *London*, 1742.

An Inquiry into the Contents and medicinal Virtues of *Lincomb* Spa-water near *Bath*, by *W. Hillary*, M. D. 8*vo*, *London* 1740.

The natural, experimental and medicinal Hiſtory of mineral Waters, by *Tho. Short*, M. D. 2 Vol. 4*to*, *London*, 1743.

An Eſſay on hot and cold Bathing, by *J. King*, 8*vo*, *London*, 1737.

De uſu arenæ externo in curandis quibuſdam morbis, *autore A. D.* 4to, Lipſiæ, 1735.

Jo. Franc. le Fevre, M. D. *Tractatus de natura, uſu et abuſu Caffé, Thé, Cocolatæ & Tabaci*, 4to, Veſunt. 1737.

Quæſtio medica, Jac. Franc. Vandermonde, M. D. Præſide, *an infirmis à morbo viribus* Ginſeng? 4*to*, Paris, 1736.

An Epiſtle to Dr. *Mead* concerning the Seneca Rattle-ſnake Root, by *John Tennent*, 8vo, Edinburgh, 1738.

Exercitatio phyſico-medica de virtute Camphoræ refrigerante, *autore* Balth. Lud. Tralles, M. D. 8*vo*, *Vratiſlav. & Lipſ.* 1735.

Lettera Scritta da. Jo. Jac. Zannichelli *intorno alle facolta dell' Ippocoſtano*, 4to, Venet. 1735.

Iſtoria della Piante che naſcono ne ledi intorno, a Venetia, opera poſthuma di J. J. Zannichelli, *fol.* Venet. 1735.

A Treatiſe on the Force and Energy of crude Mercury, by *Thomas Harris* Surgeon, 8*vo*, *London*, 1735.

Carol.

Carol. Henr. Rappolt, *de origine Succini in Ittore Sambiensi* 4to, Regiomonti, 1737.

Description des plantes, &c. Tom. 2, 3, 4, 5, 6. *par* Mr. *Fabregou.* (*See our Vol.* IV. *p.* 400. and 408.)

Bibliotheca Botanica, à Jo. Franc. Seguerio, *ordine alphabetico digesta,* 4to, Hagæ Comit. 1741.

Observations sur les Plantes & leur Analogie avec les Insectes, 8vo, Strasbourg, 1741.

Historia Botanica practica, Joan. Baptist Morandi, *fol.* Mediolan. 1743.

Herman. Frid. Teichmeyeri, M. D. *Institutiones Materiæ Medicæ, accedit* Pauli Hermanni *lapis M. M. Lydius,* 4to, Jenæ, 1737.

Tractatus de Materia Medica, sive de medicamentorum simplicium historia, virtute, delectu, & usu, autore Stephano Geoffroy, M. D. 3 *voll.* 8*vo,* Paris 1741.

S. Dale *Pharmacologia, seu manuductio ad Materiam Medicam,* 4*to,* Lond. 1737.

Materia Medica selectissima remedia, tam simplicia quam composita, ordine alphabetico secundum eorum vires & doses cum formulis, exhibens, autore Jo. Frid. Rubel. M. D. 4*to,* Lipsiæ & Baruthi, 1738.

Virium quæ terrenis remediis gratis hactenus adscriptæ sunt examen rigorosius, autore Bath. Lud. Tralles, M. D. 4*to,* Vratislav. & Lips. 1740.

A Treatise on the Powers of Medicines, by *J. Martin,* 8*vo, Lond.* 1740.

De regimine magnorum auxiliorum in curationibus morborum, autore Homobono Pisone, M. D. 4*to,* Patav. 1735.

Jo. Henr. Schulzii *Prælectiones de viribus &*

uſu medicamentorum quæ in officinis Pharmacopolarum parata proſtant, 8*vo*, Norimb. 1736.

Diſpenſatorium Medico-pharmaceuticum Pragenſe, *Fol.* Pragæ, 1739.

Pharmacopœia Auguſtana renovata & reviſa, *Fol.* Auguſt. Vindel. 1735.

The Hoſpital Diſpenſatory, by *H. Banyer*, M. L. 12*mo*, *Lond.* 1740.

The Family Diſpenſatory, by *T. Fuller*, M.D. 8*vo*, *Lond.* 1738.

The Ladies Diſpenſatory, 8*vo*, *Lond.* 1739.

A compleat extemporaneous Diſpenſatory, 8*vo*, *Lond.* 1740.

Le traité de la Matiere Medicale du Mr. Boerhaave *traduit, par* M. de la Mettrie, 12*mo*, à Paris, 1738.

Jo. Lindeſtolpe, M. D. *Liber de venenis*, 8*vo*, Francofurti, 1739.

A true and candid Relation of the good and bad Effects of *Joſhua Ward*'s Pill and Drop, by *Joſ. Clutton*, 8*vo*, *Lond.* 1736.

Ward's Pill diſſected and examined by a Chymiſt of *London*, 8*vo*, *Lond.* 1736.

Philoſophical Experiments, by *Stephen Hales*, D. D. 8*vo*, *Lond.* 1739.

Eſſays medical and philoſophical, by *George Martin*, M. D. 8*vo*, *Lond.* 1740.

Miſcellaneous Experiments and Obſervations on various Subjects, by *B. Godfrey*, 8*vo*, *Lond.* 1737.

Jo. Frid. Cartheuſeri, M. D. *Elementa Chemiæ medicæ dogmatico-experimentalis, una cum Synopſi Materiæ Medicæ ſelectioris*, 8*vo*, Halæ Magdeb. 1736.

Gabrielis Clauderi, *Shediaſma de tinctura univerſali*,

versali, vulgo Lapis-Philosophorum *dicta*, 4*to*, Norimb. 1736.

Nouveau cours de Chimie suivant les principes de Neuton *& de* Stahl, 12*mo*, à Paris, 1736.

Jo. Henr. Pott. *Exercitationes chymicæ de Sulphuribus metallorum, de auripigmento, de solutione corporum particulari, de terra foliata Tartari, de acido vitrioli vinoso, & de acido nitri vinoso*, 4*to*, Berolin. 1738.

Introduction à la Chimie accompagnèe de deux traitez, l'un sur le sel des metaux, & l'autre sur le soufre anodyn du vitriol, par M. Rothe *Medecin, avec une analyse raisonnèe de l'Antimoine, & un traité sur les tinctures Antimoniales, par Mr.* Mender, 12*mo*, à Paris, 1741.

Jo. Andr. Crameri *elementa artis Docimasticæ*, 2 *Tom.* 8*vo*, Lugd. Bat. 1739.

Petri Gerike *fundamenta chemiæ rationalis*, 8*vo*, Berolin. & Lipsi. 1740.

De usu artis anatomicæ oratio, à Cocchii Magellani, 4*to*, Florent. 1737.

Hieron. Leop. Baccheltoni *anatomia medicinæ theoreticæ & practicæ ministra*, 4*to*, Oeniponti, 1740.

Jo. Ernest. Hebenstreit, M. D. *de vermibus anatomicorum administris commentatio in act.* Lipsi. 1742.

The Art of dissecting human Bodies, translated from *Leyser's Culter anatomicus*, by *G. Thomson*, M. D. 8*vo*, *Lond.* 1740.

Bern. Sieg. Albini An. P. *Icones ossium fœtus humani, cui accedit osteogeniæ brevis historia*, 4*to*, Leidæ, 1737.

The Anatomy of the human Bones and Nerves,

&c. 3d Edition, by *Alexander Monro*, P. A. 8*vo*, *Edinburgh*, 1741.

Methodus ſecandi & contemplandi corporis humani muſculos, *autore* Jo. Frid. Caſſebohm, M.D. 8*vo*, Halæ Magdeb. 1740.

Wyeri Gul. Muys *inveſtigatio fabricæ quæ in partibus muſculos componentibus extat*, 4*to*, Lugd. Bat. 1741.

Splanchnologie ſuivie de l'Angiologie & de la Neurologie, *par* M***, 12*mo*, à Paris, 1739.

Splanchnologie de Garengeot. 2d Edit. 2. Voll. 12*mo*, à Paris, 1742.

Diſſertatio de ſtructura & motu muſculari, *autore* Alexandro Stuart, M. D. 4*to*, Lond. 1738.

Three Lectures on muſcular Motion, by *Alexander Stewart*, M. D. 4*to*, *Lond.* 1739.

Traité des Sens, *par* M. le Cat, 8*vo* à Paris, 1742.

Tractatus quintus anatomicus de aure humana, *cui accedit ſextus de aure monſtri humani*, *cum tribus figurarum tabulis*, *autore* Jo. Fred. Caſſebohmio, M. D. 4*to*, Halæ, 1735.

Tractatus de aure humana, *auctore* Ant. Maria Valſalva, *nec non ejuſdem diſſertationes Anatomicæ tres*, 4to, Venet. 1740.

Jo. Bapt. Morgagni, *epiſtolæ anatomicæ duodeviginti ad ſcripta pertinentes celeberrimi viri* Anton. Mariæ Valſalvæ, 2 Voll. 4*to*, Venet. 1740.

A Treatiſe of the Organ of Hearing, 8*vo*, *Lond.* 1737.

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Diſſertatio

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Actorum Medicorum Edinburgenſium *specimina duo*, 1. *de Medicamento alterante ex Mercurio.* 2. *De aurigine. Ex Anglico sermone Latino reddidit* Paul GotliebWerlhof, M. D. 4*to*, Hanover 1735.

LXXX. *Books proposed, and other medical News.*

DR. *Edward Milward*'s invitatory Letter, (mentioned *p.* 491.) informs us of his Purpose to publish an Account of all the *British* Improvers and Writers in the different Parts of Medicine.

The Colleges of Physicians at *London* and at *Edinburgh*, are each preparing new Editions of their Dispensatories.

Dr. *Albinus*'s Edition of *Eustachii tabulæ anatomicæ*, with his Explication of them, is every Day expected to be published.

The late Dr. *George Martin*, several of whose Essays are inserted into our Volumes, had finished his historical and critical Commentary on *Eustachii tabulæ anatomicæ*, before he set out on

his Voyage to *America:* They were approved by ſeveral good Judges in theſe Matters, and are now put into the Hands of Mr. *Monro* Profeſſor of Anatomy in *Edinburgh*, who has undertaken the Trouble of the Publication of this Work.

We have ſeen ſeveral elegant Figures of human Skeletons and muſcular Subjects, with their Explications, publiſhed by Dr. *Albinus* Profeſſor of Anatomy at *Leyden*; and hope he will continue them till we have a compleat Syſtem from him.

A Bookſeller of this Place, (*Edinburgh*), aſſiſted by ſome Lovers of Anatomy, has undertaken to give us the Figures of all the Parts of the human Body, with their Explications. He has publiſhed what he calls the *Oſteography* or Repreſentation of the Bones, contained in four Plates in *Folio*; and we have ſeen three of the Tables of the *Myography*. The Tables are neither ſo large nor ſo elegant as *Albinus*'s, having the Letters of Reference marked on the ſame Plate with the Pictures; whereas, in *Albinus*'s, the Pictures have no Letters with them, the Letters being cut on Plates where the Outlines only are repreſented. On the other hand, the *Edinburgh* Plates contain each as much Anatomy as three of Dr. *Albinus*'s, and are ſold each at one tenth of the Price of his: So that, if both are continued in the ſame Manner, till a compleat Syſtem is finiſhed, the *Edinburgh* ones will be conſiderably leſs than one thirtieth of the Price of the *Leyden* ones. The *Leyden* Tables are all Originals from the Life; the *Edinburgh* are moſtly copied from thoſe of *Albinus*, *Cheſelden*, *Cowper*, *Ruyſch*, *Morgagni*,

Morgagni, *&c.* Parts being only delineated from the Life, when there are no good Pictures to copy from.

The Marks of Reference are much more numerous in the *Leyden* Figures; and consequently the Explication is much more minute than in the *Edinburgh* ones.

Dr. *Bianchi* Professor of Anatomy at *Turin*, proposes soon to publish *Anatomiæ status priscis sæculis ad medicam praxin qui fuerit, qui vero superiori sæculo, & qui in præsenti sæculo existat, cum figuris.*

Uteri humani gravidi anatome & historia, autore Wilhelmo Noortwyk, M. D. *cum figuris*, 4*to*, is daily expected from the Press at *Leyden*.

Dr. *Haller* promises the fifth Volume of his Commentary on *Boerhaavii Institutiones medicæ*, about *January* 1744; and desires the Opinion of the Learned, whether he should stop when the Physiology is ended, or if he should give another Volume with Dr. *Boerhaave*'s own Commentary on what remains of the Institutions, Dr. *Haller* being resolved to add no Notes to this Part.

The first Volume of *Van Swieten's* Commentary on Dr. *Boerhaave*'s *Aphorisms*, is going to be reprinted, the first Edition being sold off; and the second Volume of his Commentary is in the Press at *Leyden*.

Serjeant Bernard's antient and modern History of Surgery is expected.

The Academy of Surgery at *Paris* is to publish, in Volumes apart from their *Memoires*, the Cases and Histories communicated to the Society.

Dr. *Heiſter* promiſes (*Inſtit. Chirurg.* p. 434.) to publiſh his practical Obſervations.

We are informed, that Dr. *Robert Dalrymple*, Phyſician to the *American* Expedition, is ſoon to publiſh an Account of the *Yellow Fever*, commonly called the *bilious Fever*, which is generally ſo fatal in the *Weſt Indies* to all who come from *Europe*; and we are made to hope, that he will diſcover to us a more effectual and ſucceſsful Method of treating that Fever than has hitherto been practiſed.

Dr. *Loew*, Phyſician at *Vienna*, is to cauſe his Father's *Obſervationes medicinales Hungaricæ* to be printed.

Propoſals were diſperſed ſome time ago for printing Dr. *Strother*'s poſthumous Works, being a compleat Syſtem of Phyſick, in Theory and Practice, in two Volumes *4to*.

Dr. *Stephen Macky* is about to publiſh a new Edition of *Hippocrates*'s Works at *Vienna*.

A ſecond Volume of the *Commentar. Acad. Bononienſis* is ſaid to be preparing for the Preſs by the Secretary *Zanotti*.

It is expected that the Royal Academy of *Montpelier* will publiſh a Volume of their Memoirs.

The Academy of Surgery at *Paris* propoſed the following Queſtions, for the Subjects of Diſſertations to be given in by the Competitors for their yearly Prizes.

For the Years 1735, 1737, 1739, to determine the diſtinguiſhing Character of Gun-ſhot Wounds, and the Manner of treating them.

For 1736, 1738, Whether ought cancrous Breaſts to be extirpated?

For

For 1740, 1741, 1742, To determine the different kinds of Repercuſſives, their Manner of acting, and the Uſe that ought to be made of them in the different chirurgical Diſeaſes.

The Academy of Literature, Sciences, and Arts, at *Bourdeaux*, gave their Prize of 1737 to our Countryman Dr. *Alexander Stewart*, as having, in their Opinion, beſt explained the Cauſe of *muſcular Motion*; and they gave the Prize of 1739 to Father *Bertrier*, as having wrote the beſt Diſſertation on this Queſtion, *Whether Air enters the Blood in Reſpiration?*

An Academy for the Improvement of Arts and Sciences, is lately formed at *Beziers*.

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